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ORGANIZATION AND SESSIONAL BUSINESS OF
THE FOURTH INTERNATIONAL FISHERY CON-
GRESS, WASHINGTON, U. S. A., 1908 ❦ ❦ ❦

From BULLETIN OF THE BUREAU OF FISHERIES, Volume XXVIII, 1908



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ORGANIZATION AND SESSIONAL BUSINESS OF THE FOURTH INTERNATIONAL FISHERY CON- GRESS, WASHINGTON, U. S. A., 1908 * * *

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ORGANIZATION AND SESSIONAL BUSINESS OF THE FOURTH
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Held at Washington, U. S. A., September 22 to 26, 1908

FOURTH INTERNATIONAL FISHERY CONGRESS.

WASHINGTON, U. S. A., 1908.



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- S. W. Downing, Superintendent U. S. Fisheries Station, Put-in Bay, Ohio.
- Dr. Irving A. Field, Western Maryland College, Westminster, Maryland.
- John D. Figgins, American Museum of Natural History, New York City.
- Karl Flégel, Member Imperial and Royal Austrian Fisheries Society, Vienna, Austria.
- Prof. Johann Franke, Laibach, Austria.
- Dwight Franklin, American Museum of Natural History, New York City.
- Charles E. Fryer, Secretary of Board of Agriculture and Fisheries, London, England.
- Alfred E. Fuller, U. S. Fisheries Station, Northville, Michigan.
- Dr. T. Wemyss Fulton, Aberdeen, Scotland.
- J. J. Glennan, U. S. Bureau of Fisheries, Washington, D. C.
- H. D. Goodwin, Milwaukee, Wisconsin.
- Chester K. Green, Superintendent U. S. Fisheries Station, Cape Vincent, New York.
- Prof. Frederic P. Gorham, Brown University, Providence, Rhode Island.
- Dr. E. W. Gudger, State Normal and Industrial College, Greensboro, North Carolina.
- L. G. Harron, Superintendent U. S. Fisheries Station, Washington, D. C.
- Walter E. Hathaway, White Stone, Virginia.
- Prof. Dr. Bruno Hofer, Royal Bavarian Biological Research Station for Fisheries, Munich, Germany.
- Henry Holt, Publisher, New York City.
- Dr. F. M. Johnson, Member American Fisheries Society, Boston, Massachusetts.
- R. S. Johnson, Superintendent U. S. Fisheries Station, Manchester, Iowa.
- A. G. Keesecker, Superintendent U. S. Fisheries Station, Erwin, Tennessee.
- Dr. William C. Kendall, Scientific Assistant, U. S. Bureau of Fisheries, Washington, D. C.
- Dr. George Frederick Kunz, with Tiffany & Co., New York City.
- G. H. Lambson, Superintendent U. S. Fisheries Station, Baird, California.
- Charles Lay, Sandusky, Ohio.
- John L. Leary, Superintendent U. S. Fisheries Station, San Marcos, Texas.

- Prof. George Lefevre, University of Missouri, Columbia, Missouri.
- Prof. Edwin Linton, Washington and Jefferson College, Washington, Pennsylvania.
- E. F. Locke, Superintendent U. S. Fisheries Station, Woods Hole, Massachusetts.
- Samuel Lovejoy, U. S. Fisheries Station, Bullochville, Georgia.
- Frederic A. Lucas, Curator in Chief of the Museum, Brooklyn Institute of Arts and Sciences, Brooklyn, New York.
- M. C. Marsh, Agent at the Alaska Salmon Fisheries, Bureau of Fisheries, Washington, D. C.
- Prof. S. Matsubara, Director of the Imperial Fisheries Institute, Tokyo, Japan.
- W. L. May, Denver Convention League, Denver, Colorado.
- Frank Miller, Put-in Bay, Ohio.
- Roy W. Miner, Assistant Curator, American Museum of Natural History, New York City.
- Henry O'Malley, Superintendent U. S. Fisheries Station, Clackamas, Oregon.
- William Palmer, U. S. National Museum, Washington, D. C.
- Prof. George H. Parker, Harvard University, Cambridge, Massachusetts.
- Edward E. Race, Superintendent U. S. Fisheries Station, Green Lake, Maine.
- Casimir Raveret-Wattel, rue des Acacias, 20, Paris, France.
- Dr. Jacob Reighard, Professor of Zoology, University of Michigan, Ann Arbor, Michigan.
- Paul Reighard, University of Michigan, Ann Arbor, Michigan.
- Robert K. Robinson, Superintendent U. S. Fisheries Station, White Sulphur Springs, West Virginia.
- Al. Rosenberg, Spring Brook Trout Company, Kalamazoo, Michigan.
- W. H. Safford, Conneaut Lake, Pennsylvania.
- Dr. George G. Scott, College of the City of New York, New York City.
- George A. Seagle, Superintendent U. S. Fisheries Station, Wytheville, Virginia.
- William P. Seal, Aquarist, Delair, New Jersey.
- Hon. George Shiras 3d, Stoneleigh Court, Washington, D. C.
- G. E. Simms, 61 Lamb's Conduit, London, W. C., England.
- A. Sölling, Commissioner of Danish Fisheries Department, London, England.
- John I. Solomon, Civil Engineer, 51 West Eighty-first street, New York City.
- L. B. Spencer, New York Aquarium, New York City.
- M. F. Stapleton, Superintendent U. S. Fisheries Station, Mammoth Springs, Arkansas.
- Charles H. Stevenson, U. S. Bureau of Fisheries, Washington, D. C.
- W. T. Thompson, Superintendent U. S. Fisheries Station, Leadville, Colorado.
- E. A. Tulian, Chief of Fish-cultural Section, Ministry of Agriculture, Buenos Aires, Argentina.
- Dr. Antoine Valle, Secretary-General of Austrian Society of Marine Fishing and Fish Culture, Trieste, Austria.
- Eugene Vincent, Fish Culturist, Trocadero Aquarium, Paris, France.
- Claudius Wallich, Field Superintendent, U. S. Bureau of Fisheries, Washington, D. C.
- B. O. Webster, Bellefonte, Pennsylvania.
- Andrew R. Whitaker, Phoenixville, Pennsylvania.
- R. Tyson White, Brooklyn, New York.
- E. C. Whitman, Board of Trade, Canso, Nova Scotia.
- Dr. H. V. Wilson, Professor of Zoology, University of North Carolina, Chapel Hill, North Carolina.
- S. G. Worth, Superintendent U. S. Fisheries Station, Edenton, North Carolina.
- Paul Zirzow, Oderbergerstrasse 56, Berlin, Germany.

REGULATIONS.

1. OBJECT OF THE CONGRESS.

The congress will deliberate on all important affairs concerning fishing and fish culture, and will submit propositions and memorials to governments and to provincial and local authorities.

2. MEMBERS OF THE CONGRESS.

The membership of the congress will consist of government, state, and provincial representatives, delegates from home and foreign societies, corporations, and personages invited by the management of the congress, and persons at home and abroad who are deemed to have an interest in the purposes of the congress and express a wish to take part in it.

3. RIGHTS TO MEMBERS.

All the members of the congress have the right to vote, to participate in the discussions, and to make independent propositions. In case a corporation should be represented by several delegates, the members of this delegation have the right to only one vote, which shall be cast by the delegate designated to the presiding officer. The delivery of the card of admission gives to members the right to take part in all the enterprises and excursions projected by the congress, to receive all the publications, and to wear the insignia of the congress. The members of the congress are required to conform to its regulations and decisions.

4. ORGANIZATION OF THE CONGRESS.

The congress will follow officially the preceding international fishery congresses, and will conform to the decisions for the regulation of the international fishery congresses decreed at Paris in 1900. The president and the secretary-general of the congress will be nominated by the United States Bureau of Fisheries; the vice-presidents will be elected by the congress from among its members.

5. ELECTIONS AND RESOLUTIONS OF THE CONGRESS.

All the resolutions of the congress are adopted by an absolute majority of the members present having the right to vote. (See sec. 3.) In case of division the president's vote will decide. Elections take place by ballot. Formal propositions and resolutions intended for the consideration of the congress should be in the hands of the local committee by August 1, 1908. The committee will decide on the admission of such propositions; but in case of rejection it is required to make known to the congress the reasons therefor.

6. RESOURCES OF THE CONGRESS.

The resources of the congress consist of a special appropriation by the Congress of the United States, of voluntary contributions from interested persons, and of membership fees fixed at \$2 for each person. In the case of official representatives of governments the membership fee is remitted.

7. METHOD OF DEBATE.

All the debates of the congress take place in full assembly. The official language is English, but in presenting papers and in debates members have the right to use also the French, German, or Italian language.

The meetings will be presided over by the president or vice-president, who will conduct the debates according to the established order. The president, on yielding the chair, may himself take part in the debates. The duration of the discussion of a subject will be regulated by the extent of the programme and will be communicated to the assembly before the commencement of the debate. Members desiring to speak will inscribe their names and subjects during or after the reading of papers, and the president will call on them to speak in the order of their inscription.

A member may speak only twice on the same subject in the same meeting, personal remarks and corrections excepted. The motion for the close of a debate must immediately be put to a vote; this motion once accepted, only the members who have previously asked recognition may speak. The author of a proposition or paper shall at the end of the debate be recognized for a final résumé.

8. MINUTES AND PUBLICATIONS.

Minutes will be prepared on all the proceedings of the congress and will contain the reports and debates in brief and in extenso. The full transactions of the congress will be published as soon as practicable after the final adjournment.

9. ADDITIONAL REGULATIONS.

The local committee of organization will make such further regulations as may be necessary for the proper conduct of the work of the congress.

FOURTH INTERNATIONAL FISHERY CONGRESS.

WASHINGTON, U. S. A., 1908.



SESSIONAL BUSINESS.



PRELIMINARY MEETING, TUESDAY, SEPTEMBER 22.

DEPARTMENT OF STATE.

The foreign delegates and others convened in the Diplomatic Room of the Department of State at 9.30 a. m. and were received by the Assistant Secretary of State, Hon. Alvey A. Adee.

Secretary ADEE. Gentlemen, I have much pleasure in greeting you. It would have been Secretary Root's privilege to meet you, but he is detained at his summer home, in northern New York, and has asked me to welcome you in his name. Falling on me at the last moment, this agreeable duty finds me unprepared to make a formal address. With your kindly indulgence, I venture to offer a few desultory remarks.

Your mission is beneficent. It deals with a phase of the world-old yearning for the conquest of the sea. From Salamis to Trafalgar, from Trafalgar to our own day, the peoples have been rivals for its mastery. Not alone have their mighty fleets striven for supremacy, but their traders have sought to acquire its commercial control for their own advantage. But this keen contest has been for domination upon the face of the waters. Beneath the surface lie other and nobler prizes to be won. We seek those prizes not as embittered antagonists, but as associates in the interest of the great solidarity of mankind.

Above the problem of naval and commercial supremacy is the greater problem of the sustenance and maintenance of the peoples. Without the farmer, the stock raiser, the miner, and the fisherman, there could be no wide-reaching empires, no armies, no navies, no marvelous progress in civilization, no development of culture or science, for the producers supply the means by which all these things are done. It is through the producers, the men who wring from the earth and the seas the means of supporting existence itself, that national life is begotten and developed. It is by the abundance of the producers' returns that the world's prosperity may be measured.

It was said long ago, by a philosopher of the mythical Commonwealth of Brobdingnag, that whoever could make two ears of corn or two blades of grass

to grow where one grew before would be a benefactor of mankind. How many fold greater would be he who, leaving the fertile land for the yet more fertile ocean, should develop the life-sustaining harvest of the waters in ever increasing abundance, for the benefit of all the world in generous equality.

Your purpose is a great one, and in the effort to accomplish it you meet as fellow-workers toward the general welfare. I wish you godspeed in your work.

OPENING SESSION, TUESDAY, SEPTEMBER 22.

NATIONAL GEOGRAPHIC SOCIETY HALL.

The congress was opened at 10.30 a. m. by Hon. George M. Bowers, chairman of the local committee of organization and Commissioner of Fisheries of the United States.

Commissioner BOWERS. Ladies and gentlemen, as Commissioner of Fisheries and chief of the Bureau primarily responsible for the assembly of the Fourth International Fishery Congress in the city of Washington, I do now call this meeting to order.

It gives me great pleasure to present to this meeting the Hon. Oscar S. Straus, Secretary of Commerce and Labor, who will deliver an address of welcome to the congress in behalf of the Government of the United States.

Secretary STRAUS. Mr. Commissioner, ladies, and gentlemen, it is a great pleasure and a high privilege, as head of the Department of Commerce and Labor, of which the Bureau of Fisheries forms an important part, to welcome you heartily to this the Fourth International Fishery Congress.

The subject of fish as an article of food and as an industry, and I might say amusement, is one of the oldest and dates back to the earliest history of mankind. Even in Isaiah we read, when foretelling or forecasting the dissolution of Egypt, "The fishers also shall mourn, and all they that cast angle into the brooks shall lament, and they that spread nets upon the waters shall languish," showing that even in those early times the fish and fishers were held to be one of the important considerations of mankind.

The question of food, and of fish as an important article of food for mankind, was perhaps even more important in the dawn of history than it is to-day, in that the articles of food, the contributions to what made up the sustenance of mankind, were not so extensive as they are, and as they became, as nations became more enlightened and their needs became greater.

Last spring the President of the United States, who as a historian is one of the greatest that this country has known, and whose horizon is therefore that of a historian, called together in conference the governors of our states for the purpose of considering the conservation of our natural resources—the forests, the lands, the waters, the minerals—recognizing, as all students

of these important subjects must, that we are drawing heavily upon that valuable capital, the natural resources of the land and of water, and that, looking forward to the generations that are to follow us, it becomes not only our duty, but a necessity of safe policy, to see that these great blessings that have come to us shall be handed down to those generations not exhausted in selfishness or wasted in ignorance, but as little impaired as human science and human ingenuity can provide for. In full accord with that wise and statesmanlike policy is the meeting of a congress such as this, for one of the great natural resources is fish, one of the important articles of food and one of the healthiest.

There is perhaps no more significant sign of the unity of the enlightened people of the world, of the brotherhood of mankind, than these international congresses for the purpose of promoting the welfare and happiness of the people of all nations. Here in this city now are two such international congresses meeting. Not far from here are gathered many of the scientists of the world, the great healers, the physicians, who have come together in order to compare notes, to study, to advance the knowledge that will eliminate the greatest enemy of mankind, popularly known as the "great white plague." And here are assembled men from every State, delegates from foreign countries, in order to compare notes, to exchange ideas, to discuss the various phases of the science with which they are connected, for the purpose of promoting the culture and the propagation of one of the great articles of food upon which mankind subsists. The purpose and object are worthy of your consideration.

To us in this country fish and fisheries have been of the highest importance since the earliest period of colonization. Our Pilgrim Fathers, of whom we are very proud—so proud that the whole United States might be divided into two classes, those who are descended from them and those who claim to be descended from them [laughter and applause]—for the first two years they subsisted almost entirely on fish; and I leave it to you, gentlemen of science, that perhaps that is the reason why their descendants have shown such wonderful mental powers [laughter], such aggressiveness, are so rich in brains—because their original progenitors lived for two years on fish. [Applause and laughter.]

Another point: The earliest commerce of the settlers on the New England coast was fish and lumber. Now, fish is dried, salted, and cured, and I am told that fish eaten in that way stimulates thirst very much. [Laughter.] Was it, perhaps, on that account that the early commerce with the West Indies—the exportation of cured fish—resulted in the bringing back from the West Indies of rum [laughter], sugar, and molasses? They go well together. [Laughter and applause.] A very fair exchange. Bismarck says that "the logic of the historian is as exacting as Prussia's accounting office." Let us see. One of the

great political questions that is sweeping over New England to-day is prohibition, and I suppose the reason it finds so much favor in New England is because of this, for the New Englanders are nothing if they are not historical. Historically speaking, having in mind the enormous amount of rum that they imported from the West Indies, they can say, "O, Lord, we have had our fill." [Laughter and applause.]

I need not point out to you that the quest for fish has inspired, has brought up, some of the most intrepid navigators, who, in search of fish, have become the great discoverers. It is said, with historical accuracy that I neither admit nor deny, that the continent was first discovered, or at least the northern portion of it, by the Norse fishermen. You know that the Cabots, in their discoveries, came back and placed great emphasis upon the fact of the Newfoundland cod. The cod is almost a national emblem for a part of this country, and well it may be.

Gentlemen, I know you are scientific, and you do not want to hear from me on questions of history; but one of my chief objects in talking to you, who know so much about fish from its scientific side, is to conceal from you my ignorance of the subject [laughter], and if I have succeeded in doing that I have largely accomplished what I came for.

I wish, in conclusion, to say that we welcome you most heartily, especially you who have come to us from foreign shores. We know that you have much to teach us, and perhaps we may have a little something to teach you in return. Be that as it may, whatever we have is yours. We are united with you in this great and noble work, in uniting our experience, our scientific knowledge, for the purpose not only of conserving this very important and great item of food for mankind, but of increasing it, propagating it; and no more important subject can engage the attention of scientific and practical men of all nations. [Applause.]

The CHAIRMAN. We have with us one of the Commissioners of the District of Columbia and city of Washington—one of our governors—and it gives me great pleasure to present the Hon. Henry L. West, who will extend a welcome to the congress on behalf of the city of Washington.

Commissioner WEST. Mr. Commissioner, members of the congress, ladies, and gentlemen, the citizens of the District of Columbia add, through me as their representative, to the very warm and sincere words of welcome just eloquently uttered by the Secretary Commerce and Labor.

Your meetings hitherto, I believe, have been held on shores foreign to us, and it is peculiarly appropriate that here in the United States you should hold your session in the capital of this great American Republic. We may be, as the Secretary has said, ignorant of the scientific terms and other technical knowledge regarding fish, and yet we are not unaware of the great results which are already a part of the enviable history of this congress nor of the high aims which stimulate you to still further accomplishment. And we believe and hope

that your deliberations here will add still more to the splendid record you have already attained.

The work of this congress appeals with peculiar force to the popular mind. The propagation and culture of the food fishes, as well as the preservation of the important species which would become extinct but for the care, zeal, and knowledge which you exercise, offers to every man a most attractive field and brings its large reward in the consciousness of doing good for all mankind. It is, therefore, with especial pleasure that we welcome you to Washington, in the continued and increasing development of your practical work.

We have not here, in a new country and a new city, the traditions and the histories which invest foreign capitals with so much charm; and yet you will find here in Washington many things that we hope will be of real interest to you. Yonder white-domed Capitol must dwell forever in your memories as an impressive and inspiring picture; the White House is the embodiment of our democratic life; and the tomb at Mount Vernon, when you stand beside it, whether you be an American or a foreigner, must compel your respect, if you admire in the human race the characteristics of patriotic courage and devotion. And, above all, in the laboratories and museums here you will have ample opportunity for the facilitation of that study in which you are engaged and which has earned for you the commendation of the world.

I can not, I assure you, talk either as eloquently, as confidently, or with as much experience regarding "rum and molasses" as my friend Secretary Straus [laughter], but I can join with him, and do join with him, in welcoming you to this beautiful capital, which has grown in hardly a century—in fact, the new Washington is but twenty or twenty-five years old. We can join together in welcoming you here, in expressing the hope that your deliberations may be of such advantage to you, that your experiences here may be so pleasant, that the hospitality which we will try to extend to you may leave so warm a spot in your hearts and thought, that when you leave you will have had awakened a desire to reassemble as soon as possible in the capital of the United States. [Applause.]

The CHAIRMAN. The president of the American Fisheries Society is with us, and will now extend a welcome in behalf of that society. I take pleasure in presenting Dr. Hugh M. Smith.

Doctor SMITH. Mr. Chairman, ladies, and gentlemen, it is not inappropriate that on this occasion an opportunity should be afforded the American Fisheries Society to join with the United States Government and the city of Washington in extending a welcome to those who have come from afar to participate in this gathering of the fishermen of all nations; for the society feels that its objects, its accomplishments, and its affiliations entitle it to a voice in these proceedings.

Forty years ago fish culture was a very absorbing theme among a small band of American pioneers by whom the creation of a fishery bureau under

government control was strongly advocated. A few years later, when these fish lovers had banded themselves together in a society, they continued their agitation and exerted a decided influence in inducing Congress to establish the national bureau of fisheries. A little later, when it was seen that the law incorporating the bureau contained no provision for the artificial propagation of food fishes, this same society on whose behalf I have the honor to speak persuaded Congress to authorize and make special appropriation for fish culture, which has since been conducted on a yearly increasing scale and has become the most important branch of the fishery work of the government.

This society was thus intimately concerned in inaugurating and shaping the course of the public fishery service of the United States, and it has continued to exert a potent influence in federal and state fishery affairs. It is the representative fishery organization of the Western Hemisphere, and has just held its thirty-seventh annual meeting. Its 400 active members include nearly all national and state fishery officials, as well as men engaged in private fish culture for pleasure or pecuniary profit; hardy fishermen of our seas, lakes, and rivers; managers and employees of fishing and fish-preserving companies; university professors whose biological studies deal with the inhabitants of the water; enthusiastic disciples of Izaak Walton; ultra-fastidious scientific anglers who would rather tie an artificial fly properly and cast a line gracefully than catch the largest trout—in short, all sorts and conditions of that widely distributed variety of the human species which we may call *piscatorius*.

The society has been pleased to include in its honorary and corresponding membership many who have attained prominence in various branches of fishery work in Europe, Asia, and America. A number of these members are here to-day with our other colleagues; and perhaps the greatest benefit that will accrue to our people from this congress will come not from the formal papers and discussions, important as they may be, but from the opportunity thus afforded to meet personally and informally exchange experiences with our colaborers from other lands.

Therefore, the American Fisheries Society wishes to express its great pleasure that you have come among us, and to extend to you a cordial greeting from every state and territory of this vast country; but we prefer to regard you not as representatives of great sovereign powers and influential foreign societies and organizations, but as fellow-citizens of that cosmopolitan domain where fish is king and where, as loyal subjects, we labor together for the good of the royal family and all of its aquatic relatives.

The CHAIRMAN. I have to announce that in pursuance of the established custom, those extending the invitation to meet in Washington have selected as president of the Fourth International Fishery Congress Dr. Hermon C. Bumpus, Director of the American Museum of Natural History, in New York. A motion to ratify this selection is now in order.

Dr. HEINRICH VON KADICH. I move that the nomination be ratified.

[The motion was duly seconded.]

The CHAIRMAN. You have heard the motion. As many as are in favor of the ratification say "Aye;" the contrary, "No." The motion prevails.

I have to announce further that Dr. Hugh M. Smith, Deputy Commissioner of the United States Bureau of Fisheries, has been nominated for secretary-general. A motion to ratify this selection is in order.

Lieut. RADLER DE AQUINO. I move that the nomination be ratified.

The CHAIRMAN. As many as are in favor of the ratification of this selection say "Aye;" the contrary, "No." The "ayes" have it, and Doctor Smith is duly elected secretary-general.

The permanent officers have now been selected, and I surrender the chair, with expression of the hope that the deliberations of this congress will be pleasurable and profitable, and that when you go hence, at the conclusion of the meeting, you will carry with you the feeling that the long journey many of you have made has not been made in vain. I wish you happiness and success. Doctor BUMPUS, will you come forward? [Applause.]

Doctor BUMPUS. On assuming the chair, I will ask if any one is prepared to acknowledge the courtesies that have been extended to us by the Honorable Secretary of Commerce and Labor, by the Honorable Commissioner of Fisheries, and by the Honorable Commissioner of the District of Columbia?

Dr. P. P. C. HOEK (Holland). You will please excuse my poor English, gentlemen. I might address you in another language as well, yet I believe that though my English is not quite pure, still most of you might understand me better than if I addressed you, say, in Dutch.

Gentlemen, I have been asked, and I have accepted the invitation with great pleasure, to address, first, to the United States Government, and especially the Bureau of Fisheries of the Department of Commerce and Labor; in the second place, to the District of Columbia; and in the third place, to the American Fisheries Society, the hearty thanks of the congress for this splendid and extremely agreeable reception here in Washington. But it is not only for that reception—it is especially for the excellent way in which this congress has been prepared—that we are extremely grateful to the secretary-general, of course, in the first place, and to the president, and to all the gentlemen who have given themselves the trouble to assist these other gentlemen in this matter.

Ladies and gentlemen, may I use this opportunity to tell you that a few days ago I came across an American book, a book published, I think, about thirty-five years ago and then studied by me with great pleasure on the other side, a book which I have not seen since? It was a book by Draper, and the title of that book was "The History of the Struggle between Religion and Science." It is not for the question of that struggle that I quote that book, but it is because the

formulation brought me to think about another struggle, a struggle between—let me see—human industry on one side and nature on the other side. When I say "human industry" I mean the whole of what man does—the building of great cities, the river pollution, the erection of large manufactories, navigation, all kinds of industry, mining, and much more—I mean that altogether. How does that human industry compete with nature? We soon find out that to a large extent human industry has been extremely disadvantageous—I might use a stronger word—to nature. It is true that human activity did what it could, in some cases more, in others less, to make good again what was spoiled by man on the other side. A German poet said, "Die Erde ist schön überall, wo der Mensch nicht hinkommt mit seiner Qual." You might say that in English, "Beautiful is the earth everywhere where man does not come to spoil it."

You understand, now, what I mean; I intended to say that it will be very nice to have another book written, another Draper writing a book on that struggle between industry and nature; and when such a book ever will be written I am perfectly sure beforehand that you will find in that book pages—no, whole chapters—telling of the excellent and most efficacious way in which that struggle has been taken up here in your country. And when we were honored with the invitation to come to your United States, and were glad to receive that invitation, it was, in the first place, because we enjoyed beforehand, and were sure to enjoy making acquaintance with, your excellent methods of ameliorating the fisheries in your waters.

This is nearly all I have to say to you, but when I repeat my thanks for this reception, and for the invitation, I lay stress upon the fact that it is especially because we so extremely admire the excellent way in which you have tried to propagate and to protect the fisheries, to do what you could by artificial and natural culture to promote the great industry in which we all here are so highly interested.

THE PRESIDENT. Those having the arrangement of the affairs of the congress in hand have asked me to make certain announcements, particularly in regard to the appointment of officers and committees, and with your kind permission I will make them at this time. First, I have the honor to propose the following list of vice-presidents:

As the first vice-president, and representing the Netherlands, Dr. P. P. C. Hoek, Scientific Fishery Adviser of the Dutch Government, Harlem.

Austria, Dr. Heinrich von Kadich, Councillor of Administration, Department of Forestry and Domain, Vienna.

Brazil, Lieut. Radler de Aquino, Naval Attaché of the Brazilian Embassy, Washington, D. C.

Canada, Prof. Edward E. Prince, Dominion Commissioner of Fisheries, Ottawa.

China, Dr. Wei-ching W. Yen, Second Secretary Imperial Chinese Legation at Washington, D. C.

Guatemala, Dr. Ramon Bengoechea, Consul-General of Guatemala, New York City.

Italy, Prof. Decio Vinciguerra, Director of the Royal Fish-cultural Station, Rome.

Japan, Dr. Tasaku Kitahara, Imperial Fisheries Bureau, Department of Agriculture and Commerce, Tokyo.

Mexico, Hon. José F. Godoy, Chargé d'Affaires ad interim, Mexican Embassy, Washington, D. C.

Peru, Dr. Robert E. Coker, Fishery Expert of Peruvian Government, Lima.

Roumania, Dr. Gregoire Antipa, Inspector-General of Fisheries, Bucharest.

Sweden, Dr. Oscar Fritiof Nordqvist, Superintendent of Fisheries, Lund.

German Fisheries Society, Dr. Walther Naumann, Lipsa, near Ruhland, Germany.

Royal Geographical Society, England, Mr. O. T. Olsen, Grimsby, England.

United States, Dr. Richard Rathbun, Assistant Secretary Smithsonian Institution and member of Permanent Commission of International Fishery Congresses, Washington, D. C.

[Moved and duly seconded that the nominations for vice-presidents be ratified.]

The PRESIDENT. Those in favor will signify by saying "Aye;" those opposed, "No." It is carried. The ratification will be duly recorded by the secretary.

I announce certain committees, and particularly a committee that will attend to the arrangement of the programme. There are about 100 papers that have been submitted, and naturally there is not sufficient time for the presenting of all these papers in extenso. The adoption of some scheme that will be satisfactory to the largest number, and an arrangement of the programme from session to session, has been found essential. This, it was thought, might well be delegated to a representative committee, which might consist of the following: Mr. Charles E. Fryer, Dr. Leonhard Stejneger, and the secretary-general. If these gentlemen will then kindly convene in this room at the time of the adjournment this morning, the first meeting of that committee can be held, provided the appointment meets with your approval.

Another committee—a committee on awards—will have a great deal of work to do. It was thought wise to have the committee on awards practically a number of small committees. The subjects for which awards have been arranged group themselves under five headings, and there will be announced at the session this afternoon those gentlemen whom we would like to have serve on the international committee on awards. At that time there will also be

given a full statement of the conditions under which these awards have been given and a list of the competitors.

For a committee on resolutions, these names are suggested: Prof. Edward E. Prince, Dr. Tarleton H. Bean, and the secretary-general.

Is there miscellaneous business to come before this meeting?

Dr. HENRY F. MOORE. There appears to be no other business to be presented. I therefore move that we adjourn, Mr. President, until 2 o'clock this afternoon, when the meeting will be held at the New Willard Hotel.

The PRESIDENT. Doubtless all understand that our regular place of meeting will be in the large banquet hall, on the top floor of the New Willard Hotel. Our headquarters will be there. At the anteroom you will find notice of the places at which you may receive your mail, in case it has been sent in care of the local committee. You will also find there some one who will act as interpreter and general adviser, and some one who will have charge of the local bureau of information. The meetings will be held promptly at the times announced. At 2 o'clock this afternoon the meeting will be called to order. We will now adjourn to meet at that hour.

Thereupon, at 12.05 p. m., the congress adjourned.

AFTERNOON SESSION, TUESDAY, SEPTEMBER 22.

NEW WILLARD HOTEL.

The congress was called to order by the president at 2 o'clock.

The PRESIDENT. The chair would make the following announcements:

With reference to the committee on awards, you will remember that the list of prizes has been printed and circulated, and there are some 18 prizes. The committee on awards will consist of the following subcommittees:

For prizes numbered 3, 7, and 8, Dr. Oscar Nordqvist, Dr. T. S. Palmer, Maj. Richard Sylvester, Dr. B. W. Evermann, and Dr. W. S. Harban.

For prizes numbered 1, 5, 6, 11, 14, and 15, Dr. Decio Vinciguerra, Dr. E. A. Birge, Dr. F. B. Sumner, and Dr. T. Kitahara.

For prize numbered 17, Dr. H. von Kadic, Dr. H. B. Ward, and Dr. R. E. Coker.

For prizes numbered 9, 10, 12, 13, and 16, Dr. P. P. C. Hoek, Mr. W. E. Meehan, and Mr. J. W. Titcomb.

For prizes numbered 2, 4, and 18, Dr. Gregoire Antipa, Dr. S. E. Meek, and Dr. F. W. True.

And I would request the chairmen of these respective committees kindly to apply to the secretary-general of the congress, Doctor Smith, by whom you will be given a list of the papers and the papers themselves that have been submitted to the congress in competition for these awards.

The committee on programme found themselves somewhat in doubt in regard to the wisest way in which to arrange the programme. It seems that we have two kinds of papers—some that are submitted in competition and some that are not submitted in competition. The committee on programme have felt that it was to the best interests of the congress to have the papers presented here irrespective of whether they were or were not offered in competition; and, feeling that they had the confidence of the members of the congress to the effect that they would be quite impartial in selecting papers for presentation, have decided, so far as their work is concerned, to arrange the programme for the successive sessions without respect to the question of competition. The question of competition is left to an entirely different committee or committees.

The committee on programme, moreover, have felt that it would be fair to all that the time limit for papers presented should be fifteen minutes, unless voted an extension by the congress. It was also felt that discussion would be stimulated if the time for those discussing the papers presented should, in the initial case, be limited to three minutes. Therefore, the chair will follow the instructions of the committee, unless it is instructed by the congress to the contrary.

The chair has been asked to make certain announcements.

All members of the congress who have not received invitations, cards, et cetera, to the President's reception, Secretary Straus's reception, the lecture at the National Geographic Society, and all other functions connected with the congress, should call at room 1001, the anteroom in the New Willard, to secure these cards of invitation; and I beg of you to keep in touch with room 1001. It is practically our headquarters between sessions.

The members of the International Fishery Congress and ladies are invited to be the guests of the American Fisheries Society at an informal lunch to-morrow at the Arlington Hotel, at 12 o'clock sharp. This is a lunch given by the American Fisheries Society, the society that adjourned yesterday in order that it might merge its meetings with yours.

The programme that has been submitted for the meeting this afternoon has been roughly outlined upon the blackboard. Mr. Olsen has consented to open the congress with his paper, "International Regulations of the Fisheries on the High Seas." Mr. Olsen, will you kindly come forward to the platform?

Mr. O. T. OLSEN (England). Ladies and gentlemen, I rather regret that I should be called upon so early to read the paper which I had prepared but not quite finished; and should it be disjointed I hope you will forgive me and let me down gently, for I have come a long way on short notice, and therefore have not been able to finish what I intended to do.

The paper relates to a very extensive subject, and to do justice to it here would take up considerably more time than we shall be able to afford, as there

are many speakers to come after me. I think the best plan will be to begin with the territorial waters or sea-fishery limits.

[Mr. Olsen's paper appears on pages 77-82.]

The PRESIDENT. Mr. Fryer has consented to open the discussion on this paper—the initial paper of the congress.

[Mr. Fryer's remarks appear on page 83.]

The PRESIDENT. I am sure all Americans feel with me the great sense of gratification that it is to be permitted to listen to and to meet those with whose work we are so familiar, but with whom we have not heretofore had the privilege of personal acquaintance. I feel like thanking personally both of the gentlemen that have opened the discussion, and I am sure that we all feel the same way about it.

The paper that has been presented is now open for general discussion. Are there any contributions from the floor?

[Dr. B. W. Evermann thereupon addressed the congress in continuation of the discussion. His remarks appear on page 85. Mr. A. Kelly Evans followed, and his remarks appear on page 87.]

The PRESIDENT. Are there others who will contribute to this discussion?

[Mr. John J. Pew then spoke on the regulation of beam trawling, and his remarks will be found on page 88. The discussion of the same subject was continued by the president, Doctor Hoek, Mr. North, and Mr. Fryer, whose remarks appear on page 89.]

The PRESIDENT. We are still discussing the first paper on the programme. Are there others who will contribute to the discussion?

Mr. C. H. WILSON (New York). Mr. President, I would like to get into this discussion for just a minute.

[The remarks of Mr. Wilson on the condition of the fisheries of the Great Lakes are given on page 89. He was followed by Mr. Henry Hinrichs, who spoke on the same subject and whose statements may be found on page 90.]

The PRESIDENT. Are you now ready to proceed with the second paper? Is Professor Prince here, please? Will Professor Prince rise? [No response.] Then the next paper is one to be submitted by Mr. Hathaway. The paper is entitled "Effects of Menhaden Fishing upon the Supply of Menhaden and of the Fishes that Prey upon Them," by Walter E. Hathaway, of Whitestone, Virginia.

[Mr. Hathaway's paper is printed on pages 269-277, and was briefly discussed by the president and Dr. Hugh M. Smith. See page 277.]

The PRESIDENT. The secretary has one or two announcements to make.

The SECRETARY-GENERAL. I desire to call attention to a typographical error in the invitation card to the moving pictures which will be displayed by courtesy of the New England Forest, Fish, and Game Association. The card reads "September 26th," but is intended to read "September 22d." The function is this evening.

These very beautiful bouquets that decorate our desks have been presented by the exceedingly efficient chairman of our local entertainment committee, and are sent to this meeting with the compliments of the White House, with the further request that they be given to the ladies in attendance when we adjourn. [Applause.]

I have great pleasure in reading this cablegram from Prof. Dr. Franz Steindachner, the president of the Third International Fishery Congress, dated Vienna, September 22:

"An old lover of fishes regrets his absence and sends best wishes." [Applause.]

[The congress took a recess of five minutes, after which the discussion of Mr. Hathaway's paper on the menhaden was resumed, and Mr. Cooper and Mr. George P. Squires spoke. Their remarks appear on page 278.]

The PRESIDENT. Is Doctor Coker here? [No response.] Then is Dr. I. A. Field here? [No response.] Then Dr. George W. Field, of the Massachusetts Commission, who has spent a great deal of time on the various problems connected with the lobster.

[Doctor Field spoke on "Lobsters and the Lobster Problem in Massachusetts." His remarks are given in full on pages 209-212. The discussion which followed (see p. 213-217) was participated in by the president, Mr. H. T. Root, Mr. W. H. Boardman, Mr. James Donahue, Mr. Fryer, and Dr. George W. Field.]

The PRESIDENT (at the conclusion of the discussion on lobsters). Are there other contributions? If not, I will read a communication that has been received by the Rhode Island Commission of Fisheries from Robert Aldrich & Co., fish trappers and trawlers, of Wickford, Rhode Island. The letter is dated September 18, 1908, and is as follows:

It is our belief that the continual firing for a week of the heavy guns at Fort Greble has a serious effect on the squeteague fishing in West Bay. Last June the squeteague were entering the bay just before the militia went to the forts, and for some few days we had good fishing. As soon, however, as the firing commenced at Fort Greble the catches became very much smaller and by the end of the week we got very little. We can not prove, of course, that the firing was the cause of this, but we believe that it had a good deal to do with it. We do know that a school of menhaden in the vicinity of Dutch Island will "shower" every time a big gun is fired. Squeteague enter the bay in large schools and they must pass close to Dutch Island. The militia go to the forts every year just as the squeteague are at the height of their run, and we think the steady firing has a tendency to drive them back and out of the bay. After the fish have got by the forts and are well distributed in the bay the firing would probably have little effect—that is, about August 1. We have it on pretty good authority that in one of the large bays in Ireland the fishing has been very poor for a number of years since the battle ships have had their target practice there, while in the other bays the fishing has been normal. We write this hoping that perhaps the question may be discussed and more facts discovered at the coming fishery congress.

The PRESIDENT. Perhaps some of the members present have information in regard to the effect of heavy firing upon fish.

Mr. HATHAWAY (Virginia). Mr. President, I would like to make a statement in regard to that. A year or two ago our fleet came up into the Chesapeake Bay and made their headquarters off Tangier Island, about the center of our menhaden fishing. This we believe to be a positive fact, indicated by what we saw and experienced. They were practicing, and our fishing was around within 10 miles; and every day the fishermen would find a school of fish—as the menhaden are a surface fish—and away would go one of those guns and down the fish would go, and not a fish for the poor fisherman. And many of our friends know what kind of oaths our fishermen utter under those circumstances. [Laughter.] We believe, judging from our fleet, according to the estimated catch of the fish by the number of vessels we had at work, that by that fleet coming and practicing for a few weeks, \$4,000,000 loss was sustained in our state. It is a fact that the fleet drove every fish away as fast as every gun would go. The fish had just come up there and the fishermen had just got among them, and they absolutely drove away every fish from us; so much so that we petitioned through our Representative in Congress that they withdraw the fleet from our grounds, and I am very proud to say that they did.

The PRESIDENT. May I ask some one in the Bureau of Fisheries whether the government is now making any observations with reference to the effect of gun practice?

Dr. FRANCIS B. SUMNER (Woods Hole Laboratory, Massachusetts). We have some data on that subject—unfortunately not nearly as much as we could have wished for. Nearly all that I shall say is on the authority of Prof. G. H. Parker, who, as many of you know, is a well-known student of animal physiology, and especially a student of the physiology of the sense organs and of reactions to stimuli. Professor Parker several years ago made some investigations in the endeavor to answer the question, Do fishes hear? As many of you may know, there has been a good deal of difference of opinion as to whether fishes hear at all. It was claimed at one time that fishes could hear even such sounds as the shouting of persons on shore, or in a boat, or even the ringing of a bell. There is that classical story, which perhaps some of you have heard, of the monastery in Europe, where a bell was rung periodically and the fishes came up to get their food. A scientist—I do not recall his name—took the trouble to investigate the report and found it to be quite correct. He looked a little further, however, than the ordinary observer, and he found that what the fish really did was to respond to the sight of the approaching person, and not at all to the sound of the bell. The bell had nothing to do with it.

Professor Lee, of Columbia University, also made some experiments upon the hearing of fishes more than ten years ago, and his conclusion was entirely negative. While he granted, of course, that the obvious auditory organ or organs which exist in the ear region of a fish are there for a purpose—in other words, that they have a function—this function he did not believe to be hearing

Professor Lee came to the conclusion that his fishes did not hear, so far, at least, as he could get any responses from them. Professor Parker, however, working a few years ago in the employ of the Bureau of Fisheries at our laboratory at Woods Hole, proved pretty definitely that certain fishes, at least, did respond to sound stimuli. He put fishes into a moderately small tank in the laboratory and had an apparatus contrived by which he could transmit sound vibrations which would shake the tank and thus the water. By this means he could virtually eliminate mechanical stimuli, and yet allow the fishes to be affected by stimuli which were rapid enough to produce in ourselves auditory sensations. Professor Parker's results led him to believe that fishes could hear to a limited degree. He worked chiefly on a certain small noncommercial fish known as the "killifish" or "mummichog" (*Fundulus heteroclitus*); also on the squeteague, or weakfish.

Now, when this question came up recently as to whether the battleships actually did disturb the fishes on our coast, as has been alleged pretty vociferously in certain quarters, and also whether the motor boats disturb these fishes, naturally the man to whom the Bureau of Fisheries turned for information was Professor Parker. The original intention was that Professor Parker should carry out some experiments with the cooperation of the Navy Department—that is, the Bureau had correspondence with the Navy Department, and an arrangement was made, which, however, unfortunately miscarried. We sent a boat down to the vicinity of No Mans Land, off Marthas Vineyard, where this firing was to take place, but the battleship was not there at the time. Since then other propositions have been made by the Navy Department, and we might perhaps have made an arrangement with them, but the thing was otherwise not practicable at the time. We are in possession, however, of the following data: We had in Woods Hole Harbor this summer one of the large revenue cutters, the *Gresham*. Those cutters, as you know, are, of course, provided with nothing like such heavy guns as are the naval vessels, but still with good big guns, which, at short range, make a concussion unpleasant to people in the neighborhood of them, and, of course, a very loud sound. Professor Parker went across Woods Hole Harbor with his fishes. The gun was pointed at him, firing, of course, a blank charge, and he made observations. The fishes were placed in a little pen of netting, which was floated on the surface of the water. Doctor Parker is so accustomed to observing the reactions of these fishes to stimuli that he would naturally detect even very slight effects, which might not be noticed by a less skilled observer. He took out several kinds of fishes for this experiment. He tried them, first, at a distance of perhaps 300 or 400 yards; next somewhat closer than that, and, finally, almost directly underneath the guns of the vessel. There were absolutely no responses noted on the part of any of these fishes. That, of course, does not prove what a naval

vessel might do; but what a revenue cutter could not do in that line at a distance of 50 feet it is not likely a naval vessel could do a mile or even a quarter of a mile away.

As to the motor boats, Professor Parker got exactly the same results. He used some surface-living fishes, the mackerel among others. This is one of the fishes which, it was alleged, were disturbed most by these noises. So he had fishermen go around with a motor boat, with the discharge out of the water, and also with it turned under the water. In the latter case the sound is "muffled" to our own ears, and yet, of course, strong vibrations must pass into the water and would presumably affect the fish more under those conditions if there was any effect at all. In these experiments, also, there was no response whatever. If the motor boats came near enough and the mackerel saw them, why, "down they went," as the gentleman here has described; but if the motor boats did not come within sight of the fish, but merely made the sound under the water, there was no response whatever.

Of course, these results are not conclusive. It is desired to try these experiments with large guns; but so far this has not been practicable. In the meantime, however, I thought that these conclusions might be of some interest.

The PRESIDENT. What are your wishes in regard to this communication from Messrs. Aldrich & Co.?

Mr. HENRY T. ROOT (Rhode Island). I do not know what has been the experience of the members of this congress generally, but in our section we are having a considerable number of complaints about the firing of the great naval guns, and I am glad the subject has come up. I move that this whole matter be referred to a committee to be appointed by the chair.

The PRESIDENT. You have heard the motion. Is the motion seconded?

Mr. L. L. MOWBRAY (Bermuda). In the Bermudas we have made some experiments with that, and we think it is really due to explosive shells exploding very close to the surface of the water. They found many dead fish. It is a well-known fact that such explosions greatly disturb fish.

The PRESIDENT. The motion has been made and seconded that this matter be referred to a committee. Those in favor of such reference will please signify by saying "Aye;" contrary minded, "No." The motion is carried. I appoint Messrs. Root, Smith, and Sumner.

I am asked by the secretary to make the announcement that the several committees on award, by referring to the secretary at the conclusion of this session, will be given certain papers that have been submitted in competition.

Shall we continue with other papers—it is now 5 o'clock—or shall we adjourn for this afternoon? If the chair hears no motion to adjourn, he will continue.

Adjournment was taken, with announcement of an informal meeting at the National Geographical Society building at 8 o'clock in the evening.

At 8 o'clock p. m., at the invitation of Mr. Richard E. Follett, vice-president and manager of the New England Forest, Fish, and Game Association, the members proceeded to the hall of the National Geographic Society and witnessed an exhibition of motion pictures of fishing, hunting, and logging scenes, some of which had never before been displayed.

MORNING SESSION, WEDNESDAY, SEPTEMBER 23.

NEW WILLARD HOTEL.

The congress was called to order by the president at 9.45 o'clock.

[After calling for Prof. E. E. Prince and Dr. I. A. Field, who did not respond, the chair recognized Chevalier Guido Rossati, who spoke on "Economic Conditions of the Fisheries in Italy." Mr. Rossati's remarks appear in full on pages 323-332.]

Dr. Tasaku Kitahara then read a paper entitled "The Fisheries of Japan, Considered from the Geographical Standpoint." This paper will be found on pages 375-379.]

The PRESIDENT. The paper of Doctor Kitahara is open for discussion. Are there questions to be asked in regard to the fisheries in Japan? Are there experiments that have been made that we can profit by? If the paper is not discussed, I will then ask for the next, a paper by Mr. Charles H. Stevenson; and in introducing Mr. Stevenson I would like to present to the congress a book that has recently appeared, of which Dr. George F. Kunz and Mr. Stevenson are joint authors. This book will be placed on the table here for inspection. It is entitled "The Book of the Pearl," and it is bound in form appropriate to the contents. It is a most beautiful volume.

[Mr. Stevenson dealt with "Preservation of fisheries on the high seas," reading extracts on this subject from his paper on "International Regulations of the Fisheries of the High Seas," which appears in full on pages 103-178.]

The PRESIDENT. The paper that you have listened to is now open to discussion.

[The paper was thereupon discussed by Mr. Olsen and Mr. Fryer, for whose remarks see pages 179 and 180.]

The PRESIDENT. Are there others who will speak on this most interesting topic? I imagine that we have discovered this morning an authority for a forthcoming work on piscicultural jurisprudence. If there are no others to speak on this matter, I will call for another paper that bears upon the subject, by Mr. Dennis.

Mr. OREGON MILTON DENNIS (Baltimore, Maryland). Possibly a word of explanation, Mr. President and ladies and gentlemen, is due at this time, in view of the fact that the paper which I have prepared was intended to be delivered before the American Fisheries Society. When I arrived in Washington yesterday I found that for the time being, at least, the American Fisheries Society had been absorbed by this congress; and I therefore thank you, gentlemen, for this opportunity, in view of those facts.

Another word: The views which I shall express are not those as a representative from my association, nor from my state, nor from the fact that I have been the state warden of Maryland. They are views gathered from experience in filling those various offices. I make that explanation because I want to stand personally responsible.

[Mr. Dennis's paper appears on pages 187-192.]

The PRESIDENT. Are there comments upon this paper? Is Doctor Sumner present? [No response.]

The remaining papers for this morning are papers that will be illustrated by the lantern. Doctor Sumner will deliver the first paper and Mr. Townsend the second paper—the first upon certain biological survey work that is being carried on at the station at Woods Hole under Doctor Sumner's direction, and the second paper, a most interesting one, giving illustrations that were taken in the field by Mr. Townsend, showing the appearance of the seal islands off the Alaskan coast, the behavior of the seals, the methods of capture, and so on. I am sure all members of the congress will wish to stay this morning until 12 o'clock to listen to these two papers. While we are waiting for Doctor Sumner, however, there are certain announcements I have been requested to make.

The chairmen of the respective committees on awards are asked to meet immediately after luncheon to-day at the Arlington at such place as may be indicated by Professor Birge. Professor Birge will be at the Arlington, and will arrange with the various chairmen for a joint session—not any other committees, but the committees on awards. I beg that the chairmen of these committees will confer with Professor Birge during the luncheon hour at the Arlington.

Of course, you understand that members of the International Fishery Congress and ladies are invited to be the guests of the American Fisheries Society at an informal luncheon at the Arlington at 12 o'clock sharp.

I have received a request through room 1001 to the effect that the members and those regularly attending these meetings will please register. It is very important that those who are identifying themselves with this congress should leave their names and addresses; otherwise it is impossible for the local committee to reach you with invitations and with announcements. At the conclusion of this session will you tarry long enough to register at room 1001?

I have also been requested to announce that the only members who are exempt from the payment of dues in this congress are those officially appointed from the foreign governments and the United States Government. A list of these officially appointed members appears on the programme. By some error it was suggested that those connected with the Bureau of Fisheries and not officially appointed by the United States Government were exempt from dues. I am asked to state that those who are employees of the Bureau of Fisheries will have the privilege of paying their dues. [Laughter and applause.]

To regulate the various congresses, of which this is the fourth, it is necessary that an international commission shall be convened. This commission will meet this afternoon at 1.30, after luncheon, in the Arlington Hotel, where the luncheon is served; and Doctor Smith will kindly read the names of those who are members of this international commission that will provide for the next meeting of the congress.

The SECRETARY-GENERAL. I will explain, Mr. President and gentlemen, that this Permanent Commission of the International Fishery Congresses has been appointed for the purpose of looking after the affairs of those congresses in the interim between the regular meetings; and it has as regular members persons selected from countries which have regularly participated in previous International Fishery Congresses. However, owing to the absence of a number of those members, representatives of countries not officially represented here have been invited to act with this permanent commission, and this is the list as decided on: Austria, Dr. Heinrich von Kadich; Brazil, Lieut. Radler de Aquino; Canada, Prof. E. E. Prince; China, Mr. Chang Po Ling; Great Britain, Mr. O. T. Olsen; Germany, Dr. Walther Naumann; Holland, Dr. P. P. C. Hoek; Italy, Dr. D. Vinciguerra and Chevalier Guido Rossati; Japan, Dr. T. Kitahara; Mexico, Mr. José F. Godoy; New Zealand, Mr. H. Stephenson Smith; Peru, Dr. Robert E. Coker; Roumania, Dr. Gregoire Antipa; Sweden, Dr. Oscar Nordqvist; United States of America, Dr. Hermon C. Bumpus, Dr. Richard Rathbun, and Dr. Hugh M. Smith.

The PRESIDENT. I have been requested to suggest that brief abstracts of papers—that is, abstracts that will indicate the contents of the papers—be prepared and handed to Doctor Moore. A great many requests have been received from the press and from individuals asking for the substance of the papers, somewhat more extensive than is given by the title alone. What is requested is a brief statement, in writing, of the substance of the papers that are to be presented, those abstracts to be left, if you please, on the secretary's desk or given directly to Doctor Moore. Is Director Townsend present?

A MEMBER. He is in the audience, Mr. President.

The PRESIDENT. With Doctor Sumner's consent, as it is a little late now, we will call for Doctor Sumner's paper at another session, and ask Director Townsend to present his paper, which is fully illustrated with lantern slides,

and on the conclusion of Director Townsend's paper we will proceed to the Arlington Hotel for luncheon.

Mr. Follett states that in view of there having been a large number of applications, or, perhaps, regrets, on the part of members of this congress that they were not fortunate enough to see the extraordinary exhibition of moving pictures last evening at the Geographical Society building, those pictures will again be put on the screen this afternoon at 5 o'clock at the same place, so that if you or your friends wish to come at 5 o'clock this afternoon you will be quite welcome.

The chair has been asked the duration of the touring trip this afternoon. It will consume practically two hours, the party leaving at 3 and returning about 5 o'clock.

The only other item on the programme this morning is the paper by Director Townsend, and I will ask Mr. Townsend to come to the platform.

Mr. CHARLES H. TOWNSEND (Director New York Aquarium). Mr. President and members of the congress, I shall take up only a few minutes of your time with this old story of the fur-seal fisheries; it is an old story to a great many of the officers of the Bureau of Fisheries in Washington. I suppose I can give you a very condensed account of it in about fifteen minutes, and then it will take about ten or fifteen minutes more to show you a few lantern slides I have brought along.

[For this paper see pages 315-322.]

On the conclusion of Mr. Townsend's paper, at 12 o'clock, the congress adjourned, and the members proceeded to the Arlington Hotel, where a complimentary luncheon was tendered by the American Fisheries Society.

WEDNESDAY AFTERNOON, SEPTEMBER 23.

RECEPTION BY THE PRESIDENT OF THE UNITED STATES, AT THE WHITE HOUSE.

The members of the congress and accompanying ladies assembled at the White House, and at 2.30 o'clock were received by President Roosevelt in the East Room. The President greeted the members as follows:

LADIES AND GENTLEMEN: I shall not try to make you any address, because I am to have the pleasure of shaking hands with each of you. I shall simply say what a pleasure it is to me to greet you here. I have grown to feel more and more that the problem of the conservation of natural resources is the great material problem before modern nations. Savages, barbarians, semicivilized people, and a good many civilized people do nothing but waste natural resources, and it is our business as we become more civilized to try to conserve them. That applies exactly as much to fisheries as it does to forests. One of the problems that will come up in connection with our treaties with foreign nations hereafter must be the arrangement of a method of preserving international fisheries—such fisheries as those in Lake Erie and Puget Sound. It is an outrage

to leave them to be squandered so that our children shall lose all benefit from them, and some method must be devised by international agreement for preserving them.

I am glad to have the opportunity of seeing you.

Each of the members was then presented to President Roosevelt by the secretary-general.

Following the President's reception a group photograph of the delegation was taken on the west portico of the Treasury Department building.

The remainder of the afternoon was spent in an automobile tour of the city for sight-seeing.

At 7.30 o'clock p. m., the members visited the Library of Congress in special cars, and were received by officials of the Library.

MORNING SESSION, THURSDAY, SEPTEMBER 24.

NEW WILLARD HOTEL.

The congress was duly called to order by the president at 9.50 o'clock.

The PRESIDENT. There are here on exhibition a few specimens that were submitted in competition for one of the prizes. These three specimens are submitted by one competitor. Here [indicating] is another specimen that is submitted by another competitor. I hope at your convenience you will examine them.

Are there matters of business to come before the congress? Upon the blackboard are listed the papers that will be presented to-day, and as far as possible they will be called for in that order. Of course, there are some gentlemen who have been unable to get their papers back from the committee on awards. We will now call for the first paper, as announced on the board. Dr. W. W. Yen is to present a paper on "The Fisheries of China." Doctor Yen, will you please come to the platform?

[This paper will be found on pages 367-373.]

The PRESIDENT. I think if we had come here merely to listen to this one paper we would have been repaid. As an indication of the progress in China, not only have we listened to this paper—this astonishing paper—but China has also delegated six persons to attend this congress, four of whom you must have noted are in constant attendance. The discussion of this paper and the presentation of other matter bearing upon the progressive attitude that China is taking in regard to the fisheries will be undertaken by Mr. Chang Po Ling, who is the special commissioner from Tientsin.

[Mr. Chang, however, asked to be excused, as having had little experience in public speaking.]

The PRESIDENT. At this hour, with your permission, I would ask to be relieved of occupying the chair, and will Doctor Hoek kindly take it?

[Whereupon Vice-President P. P. C. Hoek took the chair.]

Dr. HERMON C. BUMPUS. Mr. President, on behalf of Doctor Mead, who has been working for a number of years upon the problems connected with the propagation of the lobster, I would like to present informally to this congress reports upon his work, which are submitted in this substantial manner [showing manuscript and illustrations], and which I trust certain members who are interested in this work will examine.

[Doctor Bumpus then gave an abstract of the two papers by Dr. A. D. Mead, "A Method of Lobster Culture" and "A New Principle of Aquiculture," which are given in full on pages 219-240 and 759-780.]

Vice-President HOEK. Gentlemen, in the absence of Doctor Mead, I think we owe great thanks to Professor Bumpus for the excellent way in which he has given us a summary of these most interesting papers. I may say it, because they belong to a group of papers submitted to a committee of which I have the pleasure and honor to be chairman—the committee on awards. Of course, it would be entirely indiscreet to tell you about the conclusion to which that committee will come; at the same time, I am perfectly at liberty to say that we have at the present moment a very high regard for these excellent papers, not only for the contents but also for the excellent way in which these papers have been prepared, and the most excellent photographs and illustrations which are added to them. So, gentlemen, perhaps it will be of use to have them circulated among you, and, by all means, if the gentlemen wish to review them it will give me great pleasure to hand them over.

Before proceeding, the secretary-general is to give you a short announcement.

The SECRETARY-GENERAL. The office of the congress has received through our State Department communications from practically all of the governments of the earth in regard to their participation in this congress. Among the absentees which we particularly regret is Russia, a country which has such important fisheries and fishery resources. We have received only this morning through our State Department a communication from the American ambassador at St. Petersburg, in which he states that the foreign office has just advised him that they can not be represented at this congress, since they have but two fishery experts, Doctor von Grimm, who is an old man and can not get ready in time, and Mr. Borodine, who has just completed a term in prison for signing the Viborg manifesto, and whom they are unwilling to send on such a mission at this time. [Laughter.]

Vice-President HOEK. We next come, gentlemen, to a paper by Mr. Charles G. Atkins, Superintendent of the Fisheries Station at East Orland, Maine, entitled "Foods for Young Salmonoid Fishes." Is Mr. Atkins present?

Mr. CHARLES G. ATKINS. Mr. President and members of the Fishery Congress, I have a paper here on food for young salmonoid fishes. I much regret that the time at the disposal of the congress does not allow me to read this in full, as in the abstract that I shall give you I shall be obliged to omit a great

many statements that appear to be important and which I think might be interesting to you, but I shall endeavor to give you the gist of it and the most important points.

[Mr. Atkins then presented his paper, which appears on pages 839-851.]

Vice-President HOEK. I now open the discussion on the beautiful lecture we have had from Mr. Atkins. Does anyone wish to ask questions of Mr. Atkins, or to communicate something in relation to the subject? If not, then it only remains as my duty to extend to Mr. Atkins thanks for his excellent paper.

I think we now come to the paper of Mr. L. F. Ayson, of New Zealand, which will be read by Mr. H. Stephenson Smith.

Mr. H. STEPHENSON SMITH (New Zealand). I very much regret that we are unable to hear the gentleman who is the author of this paper, Mr. L. F. Ayson, Superintendent of Fisheries at Wellington, New Zealand. I think a great many of the members know him, and know him to be a very able man. I regret that he is not here to read it.

[Thereupon Mr. Ayson's paper on "The Introduction of American Fishes into New Zealand" was read. This paper is printed on pages 967-973, and is followed by remarks of Mr. H. Stephenson Smith on geographical features of New Zealand.]

Vice-President HOEK. Ladies and gentlemen, you all heard the interesting paper of Mr. Ayson, as it was read by Mr. Smith, and now perhaps Mr. Smith is willing to give further information, if some of the members desire to ask questions.

Mr. SMITH. I will have much pleasure in giving any information I can.

Vice-President HOEK. Should any of you wish to ask Mr. Smith questions regarding this paper of Mr. Ayson, he will gladly respond. You heard from him that it is not his paper, but that of the Superintendent of Fisheries for New Zealand.

[Mr. John W. Titcomb and Prof. Edward E. Prince discussed the paper. See page 974.]

Dr. T. KITAHARA (Japan). The Congress may be interested in the results of the transplanting of American fishes into the waters of Japan. For this we owe much to the kindness of the American authorities. First of all in 1877, 10,000 eggs of the rainbow trout were transported to the Bureau of Agriculture, Tokyo, through the kindness of the fish commissioner of California. It is believed that this was the first transplanting to another country ever tried with that species. About half the number of the eggs sent died on the way, the remainder were taken to Mr. Sekizawa's home, and hatched in the water of the well near his house. The resulting fry were liberated in a small pond in the suburb of Tokyo. As the fish grew larger the pond became too restricted, so the fish were again transferred to another larger pond. In 1879, 20,000 eggs were procured from 5 fish, hatched, and distributed to the lakes at Nikko and Wakamatsu (Aiza). Ten years afterwards

(1887), 4,000 fry of the same species were liberated in the lake at Nikko, and recently, in 1907, 200,000 fry brought from America in the form of eggs were put into the same lake.

Vice-President HOEK. We had better go on at once to the next paper. If I am reliably informed, we shall have considerable discussion on the whitefish production of the Great Lakes. May I ask whether Mr. Frank N. Clark, Superintendent of the Fisheries Station at Northville, Michigan, is present? Will you now give us the pleasure of hearing your paper, sir?

Mr. FRANK N. CLARK. Mr. President, ladies, and gentlemen, having received a communication from the secretary-general of this congress requesting me to prepare something upon a subject which comprises the study and labor of the past forty years of my life, and realizing that the papers which would be submitted at this meeting for your thought and consideration would be innumerable, I have concluded that a mere outline of my plan for the promotion of the whitefish industry of the Great Lakes is the most that would be proper for me to submit to you on this occasion. In preparing the following paper I was not unmindful of the desirability of eliminating, in so far as possible, complicated and tiresome matter.

[Mr. Clark then read his paper, "A Plan for Promoting the Whitefish Production of the Great Lakes," which appears on pages 635-642.]

A MEMBER. There are two more papers on this subject. Each one advocates an open season during the spawning season of the whitefish, and each one proposes remedies very similar to those of Mr. Clark. I therefore move, sir, that before having any discussion on this paper the other papers be read.

[The motion was duly seconded and carried.]

Vice-President HOEK. I have the pleasure now to say that the paper of Mr. S. W. Downing, superintendent of the United States Fisheries Station at Put-in-Bay, Ohio, will be read by Mr. Titcomb.

[Mr. Downing's paper appears on pages 627-633.]

Vice-President HOEK. Professor Ward, will you be so kind as to read for us the paper of Mr. Paul Reighard of the University of Michigan, Ann Arbor, Mich., on this same subject?

Prof. HENRY B. WARD. I have, Mr. President and gentlemen, been requested to read the paper by Mr. Reighard on a plan to promote the whitefish production of the Great Lakes. It is my intention, even at the risk of doing the paper injustice, to present merely a few words of the introduction and the conclusions.

[The paper of Mr. Reighard was then read in abstract, and appears in full on pages 643-684.]

Vice-President HOEK. Gentlemen, we have had three papers on that interesting question, the promotion of the whitefish production of the Great Lakes, and it is understood that the discussion of the question shall take place in the afternoon; and I have now the pleasure of calling on Mr. J. W. Titcomb, the

chief of the division of fish culture, United States Bureau of Fisheries, to give us his lecture on American fish-cultural methods.

A MEMBER. While the lantern is being made ready, I would make the announcement that the chairmen and secretaries of the several committees on award are requested to meet on this side of the room immediately following the lecture.

[The lecture of Mr. Titcomb was then delivered. It will be found on pages 697-757.]

Vice-President HOEK. Three cheers for the Bureau of Fisheries, and our thanks to Mr. Titcomb for his very interesting exhibit and explanation.

Thereupon, at 12.45 p. m., the congress adjourned to meet at 2.30 p. m., and the members were tendered a complimentary luncheon at the New Willard Hotel by the Blue Ridge Rod and Gun Club.

AFTERNOON SESSION, THURSDAY, SEPTEMBER 24.

NEW WILLARD HOTEL.

The congress was called to order by the president at 2.30 o'clock.

The PRESIDENT. The time has come for our afternoon session. I shall first call for the report of the international commission which is in charge of the affairs of the congress. Doctor Smith, secretary-general, will present the report.

Doctor SMITH. Mr. President, ladies, and gentlemen, a meeting of the Permanent Commission of the International Fishery Congresses was held yesterday, the 23d of September. The members of this commission in attendance were Messrs. Bumpus (chairman), von Kadich, Vinciguerra, Rossati, Antipa, Nordqvist, de Aquino, Olsen, Naumann, Godoy, Bengoechea, and H. M. Smith (secretary).

Doctor Vinciguerra presented an invitation from the Italian Fisheries Society to meet in Rome in 1911, on the occasion of the fiftieth anniversary of the Italian Federation. An invitation was likewise received from the mayor of Rome. The commission unanimously accepted the invitation and agreed to report the same to the congress for final ratification.

Dr. Walther Naumann, representing the German Fisheries Society, announced that at the next congress an invitation to meet in Germany would be formally presented.

The proposition of Mr. Nicholas Borodine for an international dictionary of fishing and fish-cultural terms was indorsed, and the secretary was instructed to bring the matter to the attention of the congress, with a favorable recommendation to the committee on resolutions.

After some further business that need not come before the general congress, the commission adjourned.

The PRESIDENT. You have heard the report of the secretary of this commission. A motion to adopt the report is in order.

A MEMBER. I move, sir, that the report be adopted.

The PRESIDENT. The motion has been made favoring the adoption. Is this motion seconded?

[The motion was duly seconded.]

The PRESIDENT. The matter is now open to discussion. Are there those who wish to discuss this report? If not, the motion will be put.

[The motion was duly carried.]

The PRESIDENT. Are there other matters to come before the congress?

Doctor VINCIGUERRA. I am sorry that I can not well explain in English my deep gratification and that of my country in realizing that the congress has agreed to accept the invitation of the Italian Fisheries Society; and I am sure that the members of the congress in Italy will be found in accord in a reception, if not so great as in America, as kind and as friendly as that we have had here. [Applause.]

The PRESIDENT. I am asked to convene the committee on resolutions. The committee on resolutions will meet immediately after this afternoon session, and the members of that committee I shall again announce, so that there may be no misunderstanding. They are Prof. Edward E. Prince, Dr. Tarleton H. Bean, and the secretary-general.

Is there other matter for consideration, Mr. Secretary?

The SECRETARY-GENERAL. The office is in receipt of a cablegram from the Uruguay Lobos Fishing Company, involving a matter which had probably better be referred to the committee on resolutions, but which it might not be out of order to read:

LONDON, *September 24, 1908.*

SECRETARY INTERNATIONAL FISHERY CONGRESS,
Washington.

Considering the terrible slaughter of seals due to poaching, would the congress see their way to include the question of pelagic sealing in their deliberations, as, if seals are not protected by international agreement, the species will disappear within very few years.

URUGUAY LOBOS FISHING COMPANY.

The PRESIDENT. A second communication has been received.

The SECRETARY-GENERAL. This is from Mr. Edward Hatch, jr., and reads as follows:

NEW YORK, *September 23, 1908.*

INTERNATIONAL FISHERY CONGRESS,
Washington, D. C.

Please do not fail in your deliberations to call attention to the great damage done the fish industry by sewage and manufacturing wastes.

EDWARD HATCH, JR.

The PRESIDENT. What is your wish in regard to these two important communications that have come to us by wire? Ordinarily they would be referred to the committee on resolutions.

[A motion to this effect was made, seconded, and carried.]

The PRESIDENT. Is there anything more, Mr. Secretary? If not, the next item on the programme is the discussion of the whitefish question. I have been informed that this is a rather important matter everywhere; and the chair, in view of the large number who will probably speak upon the question, will apply rather severely the instructions which he has received in regard to the limitation of the time taken by various disputants. We want a large number to speak, but the time is three minutes, unless the chair is otherwise instructed.

It is also suggested that this discussion may be a rather long one, and it might be wise to place a limit upon the total amount of time that we shall give to the first item on the programme. Is anyone prepared to make a motion that the time assigned to this question, namely, the whitefish production of the Great Lakes, shall be limited?

A MEMBER. I move that a limitation of forty minutes be placed on the entire discussion.

The PRESIDENT. The motion is made that the time for the entire discussion be limited to forty minutes. Are there any who approve? Are there any who object to this limitation?

A MEMBER. I hope that this motion will not prevail. It is one of the most important questions to come before this congress, and I think three minutes given each speaker ought to be sufficient limitation without any further restriction.

The PRESIDENT. The chair hears no second to the original motion. If the motion has not been seconded, there is no need of our taking action thereupon. We will proceed to the discussion of the whitefish question.

[The subject was discussed at length by Prof. Edward E. Prince, Mr. C. H. Wilson, Hon. Paul North, Mr. A. Kelly Evans, Dr. Barton W. Evermann, Dr. Tarleton H. Bean, Mr. Charles E. Fryer, Mr. Frank N. Clark, Mr. John W. Titcomb, Mr. William E. Meehan, Mr. Seymour Bower, Prof. E. A. Birge, Mr. W. T. Thompson, Mr. J. J. Stranahan, Mr. Samuel F. Fullerton, and Mr. Dwight Lydell. The remarks of these members will be found in the order given, the discussion beginning on page 685.]

The PRESIDENT. Are there others who wish to contribute? If not, the discussion will be closed. Unless there is objection to closing, we shall call for the paper by Dr. P. P. C. Hoek, upon the Rhine salmon. [Applause.] Professor Prince, will you kindly take the chair as vice-president? [Applause.]

[Thereupon Prof. Edward E. Prince took the chair.

Doctor Hoek then read his paper entitled, "Propagation and Protection of the Rhine Salmon," which appears on pages 817-829.]

Vice-President PRINCE. I am sure you will bear out the policy of the chair in not rigidly limiting Doctor Hoek, but giving him as much time as we could reasonably allow, because this paper, like every memoir with which

Doctor Hoek has favored the piscicultural world, is so full of real worth that it would have been a pity to omit any part of it.

I have no doubt there are some present who have some questions to ask. Now will be the opportunity for any comments or questions, but I must warn the congress that the observations must be very brief.

[The paper was briefly discussed by Prof. E. E. Prince and Doctor Hoek, whose remarks appear on page 829.]

Vice-President PRINCE. Gentlemen, as the time is passing rapidly and there seem to be no questions on this paper of Doctor Hoek, although we appreciate it very much as a valuable paper and record of personal observations, we shall proceed to the next, by Mr. W. S. Kincaid, who is to read a paper on "New Methods of Transporting Eggs and Fish." Is Mr. Kincaid present? [No response.] In the absence of Mr. Kincaid, we shall have to proceed to the next paper. The secretary-general will read a paper by Professor Matsubara.

The SECRETARY-GENERAL. Mr. President and gentlemen, this paper by Prof. S. Matsubara, on "Goldfish and Their Culture in Japan," is of great interest to many people, but I do not know that we have the time or opportunity to read it in extenso. I should certainly like to call attention to the contents of the paper and exhibit some of the admirable colored paintings which accompany it. Professor Matsubara is the Director of the Imperial Fisheries Institute at Tokyo, Japan, and, as we know, the goldfish receives more attention in Japan than in any other country.

[The paper was then read in abstract, and will be found in full on pages 381-397.]

President Bumpus at this point resumed the chair.]

The PRESIDENT. This paper is open for discussion. We have an interesting paper by Professor Prince on the "Training and Qualifications of the Modern Fish Culturist."

I am sure no one has been more surprised than I, during this afternoon's session in particular, at the amount of accurate information that seems to be on hand among the men who are connected with the various fish hatcheries of the country. I wonder where it is possible to find such men. I sat here wondering that the United States Government can succeed in getting these perfectly splendid men—men who are specialists, that do this work so well and know it in all its branches and ramifications. Now, I imagine, although I have not seen the paper that is about to be presented, that there is a plan for the direct training of such individuals.

Prof. EDWARD E. PRINCE. Mr. President and gentlemen, I fully agree with the words which you have just expressed in regard to the gentlemen who have appeared before us to-day, who are the practical fish culturists. What I have to bring before you will occupy only five or six minutes, because I

intend merely giving the main points of my paper, which is rather in the way of suggestion than of a set treatise or essay.

[This paper was then read in abstract.]

The PRESIDENT. Members of the congress, this interesting paper is open for discussion. I think that we all feel that the ground has been pretty well covered by Professor Prince. The fact that the paper is not being discussed does not indicate that we have not been very much interested in and instructed by listening to it.

May I ask if the secretary-general has the paper by Mr. Franz von Pirko, "The Naturalization of American Fishes in Austrian Waters?"

The SECRETARY-GENERAL. Mr. von Pirko has been obliged to leave the city, and I shall not read his paper, but shall simply state that he has gone to the trouble to write it in excellent English and to give us for distribution copies of it printed in German. These will be distributed to those who desire them, and the paper will simply be read by title and published in full in the proceedings. [See pages 977-982.]

The PRESIDENT. I am instructed to state that all of the papers that have been submitted to the conference and reports of the discussions taken by the stenographer will be published by the United States Government and distributed.

We now come to the last subject on the programme for this afternoon, the dogfish question, to be opened by Professor Field, and to be discussed by Messrs. Fryer, Nordqvist, Gill, Whitman, Prince, and others.

Prof. IRVING A. FIELD. Mr. President and gentlemen, I am asked to start the discussion this afternoon on the dogfish question. Before entering on that, I wish to say a few words on the mussel. The title of the paper which was called for yesterday and the day before is, "Sea Mussels and Dogfish as Food." I have here a few samples of preserved mussels and dogfish, which I shall pass around.

[Professor Field's paper appears on pages 241-248, and following it is the discussion, which was participated in by the president, Dr. Oscar Nordqvist, Dr. Theodore Gill, Mr. Charles E. Fryer, Mr. T. E. Libby, Mr. Charles G. Atkins, Mr. John J. Pew, Prof. E. E. Prince, Dr. George W. Field, Mr. Walter E. Hathaway, Mr. E. C. Whitman, and Prof. Irving A. Field.]

The PRESIDENT. If there are no more contributors to this discussion, a motion to adjourn will be put.

The SECRETARY-GENERAL. Before the motion is put, I would like to suggest that, in view of the lateness of the hour, the committee on resolutions do not meet this evening, but instead at 9 o'clock to-morrow forenoon, in this room.

Thereupon, at 6 o'clock p. m., the congress adjourned until 9.30 o'clock Friday morning.

MORNING SESSION, FRIDAY, SEPTEMBER 25.

NEW WILLARD HOTEL.

The congress was duly convened by the president at 9.45 o'clock.

The PRESIDENT. We will now begin our work. Are there any matters to be presented by the secretary?

The SECRETARY-GENERAL. Mr. President and gentlemen, many messages of good will and greeting have come to the congress from persons who are prevented from being with us. The cable message from the distinguished president of the Third International Fishery Congress has already been read. Among the other messages received have been the following:

Mr. Nicholas Borodine, Secretary-General of the Second International Fishery Congress and late Chief Specialist in Fish Culture in the Russian Department of Agriculture, asks that his best wishes be given to the members of the congress, and to those members who remember him he sends his special regards and his assurance that though unavoidably absent he is with them in spirit.

Dr. David Starr Jordan, United States International Fishery Commissioner, writes:

Will you kindly present my compliments to the Fishery Congress and express to them my interest in their work? It is a matter of sincere regret to me that I can not be present at this auspicious meeting. The affairs of the university, combined with the work of the International Commission of Fisheries, occupy all my available time, and I must forego the honor and the pleasure of being associated with this convention.

Mr. H. Wheeler Perce, president of the National Association of Scientific Angling Clubs, has written a very interesting letter, which will be published among the papers of the congress. [See pages 193-198.]

Greetings have come from—

Dr. E. L. Mark, of the Zoological Laboratory of Harvard University, at Cambridge, Mass., and Director of the Biological Station at Hamilton, Bermuda.

Prof. Dr. Bruno Hofer, of the Royal Bavarian Research Station for Fisheries, Munich, Germany.

Dr. Ernst Ehrenbaum, of the Royal Biological Experiment Station at Helgoland, Germany.

Dr. H. Henking, of the German Fishery Society, Berlin, Germany.

Prof. Jules Cotte, of the Marine Zoological Station of the University of Marseille, France.

I would also like to bring to the attention of the congress at this time some recently published or manuscript works which have been presented by their respective authors for the information of the congress.

[The secretary-general read a list of the works that had been submitted, which list, with later additions, appears on page 74.]

The PRESIDENT. Mr. Fullerton has just spoken to me about a matter of general misunderstanding in regard to the whitefish question, and it seems to

me to be of sufficient importance to be brought again before the attention of the congress. I will ask him kindly to make that statement made to me a moment ago.

[Mr. Fullerton's statement appears on page 695.]

The PRESIDENT. Unless there is some other business to be transacted before we proceed to the reading of the papers, the chair will now call for the papers as listed on the blackboard.

Doctor Meek, will you give the initial paper this morning?

Dr. S. E. MEEK (Field Museum, Chicago). I have some lantern slides.

The PRESIDENT. Is the operator not here? Then, in view of Doctor Smith's return, I will ask the secretary-general to present the paper of Mr. N. Borodine.

The SECRETARY-GENERAL. It will probably be desirable, Mr. President, to refer this communication to the committee on resolutions. Mr. Borodine writes as follows:

PROPOSAL FOR AN INTERNATIONAL CONDENSED DICTIONARY OF THE TERMINI TECHNICI USED IN THE FISHERIES AND FISH CULTURE.

One of the most important tasks of the International Fishery Congress is to make as easy as possible the study of the state of the fisheries and fish culture in all countries and to unite efforts of the specialists for the advancement of applied science concerning fishery matters and of the fishery industries themselves. A great obstacle to this, however, as to all other branches of science, is the difference of the languages in which the works on ichthyology, fish culture, and the fisheries are printed, and in the difficulty, well known to every body of colleagues, when they try to understand even only the most important points, such as conclusions, statistical tables, explanation of figures, etc., of a work written in an unfamiliar language. It is impossible to overcome this difficulty with an ordinary dictionary, because termini technici are not to be found there, and they are often very different even in the same language.

Having had, in the character of editor of the *Revue Internationale de Pêche et de la Pisciculture*, much to do with the periodicals and books on fisheries and fish culture written in all European languages, I know very well, by my own experience, how difficult it is, for instance, to make any use of the works written in Danish, Dutch, Hungarian, and other seldom-learned languages. Though the Latin saves us the difficulty, so far as concerns the names of fishes, it can not help us to understand all the other things in the book, sometimes the most interesting. Therefore I have always thought it would be very useful if the specialists of all countries would draw up a kind of little information book or dictionary in which should be found (1) names of all commercial fishes and other fishes and animals that are of some interest to the fishing industries, to sportsmen, and in fish culture; (2) denominations of the most important fishing appliances used by professional fishermen and sportsmen; (3) denominations of fishery vessels, boats, and the principal vessel implements; (4) denominations of the principal fishery products; (5) measures, weights, utensils, etc., used in fishery business, also the different moneys; (6) list of the principal termini technici used in fish culture. All of these denominations ought to be given in the following languages: French, English, German, Italian, Spanish, Norwegian, Swedish, Dutch, Russian (with Latin and Russian letters), Hungarian, Roumanian, and Japanese (with Latin and Japanese letters). Moreover, names of fishes should also be given, it should be understood, in Latin.

To accomplish such a work is not possible but in a collective way, with collaboration of the specialists of each country upon the six categories mentioned above. Naturally the book should first of all be written, as full as possible, in one of the languages, and then

the proper parallel termini technici should be given in other languages, and the list should be completed by adding the new ones, which may not exist at all in other languages, simply because there are no such objects. To avoid misunderstanding, it is to be desired that the original list of termini technici should be accompanied by some explanation of the kind used in the condensed dictionaries (Larousse, Webster, and others). The original list should be reproduced in several copies for distribution among the specialists of all countries where the above-mentioned languages are in use, and every specialist, or many of them, should give a parallel list of the names and of the termini technici used in fisheries in his own country. It is necessary, further, that all these papers should be under direction of one and the same hand in order to give them one system and similar editorial lines. In such a state the work may then be presented to the next congress, by which it should be, if found good, approved, such approbation by the congress being desired in order to fix the terminology, to unify it, and thus to facilitate the use of different books and papers in future.

Such is a general plan for drawing up an international book of information, or dictionary of fisheries and fish culture. I should say in addition that the charge of writing the original list we should beg our German colleagues to take on themselves, for these reasons: First of all, the German terminology in fisheries and fish culture is more elaborated and detailed; besides which, in the German "Handbuch der Fischzucht und Fischerei," by Professors Benecke, Dallmer, and M. von dem Borne, we find already the primitiæ of what should be included in the proposed dictionary.

There is another question: What institution, or what persons, should be engaged to see that the work is completed at the proper time? It would be natural to give this in charge to the "Conseil permanent de la pêche," an executive organ of the International Fishery Congresses. But this institution, as is well known, gives no sign of existence. Or, it would be possible to give this task to the organizing committee of the next congress. But experience shows us that this committee can scarcely accomplish such a task, because it as a rule is not itself organized until a short time before the opening of the congress and has too much work to do at that time. It remains to propose that this work be intrusted to another permanent institution having direct relations with the fisheries, it being better, of course, if such institution be of international character. The only institution of this kind, so far as I know, is the "Conseil international (and bureau of it) pour l'exploration des mers du Nord." If the honorable and highly esteemed secretary of that institution and the members thereof assisting in this congress find my proposal practicable and will be kind enough to render their assistance in the matter, it will be certain that the work will be done.

It will be understood that if my proposal is accepted this congress shall appoint persons from each country to write the respective parts of the whole work. As to the printing of the book, it would be more practicable for each country to have a separate edition, because the alphabets naturally should be the national ones. Then the question of expense for the printing, etc., would be each country's own business.

I have, then, the honor to submit to the Fourth International Fishery Congress at Washington the following proposal for a resolution:

1. That it be recognized as desirable and useful to draw up an international dictionary on fisheries and fish culture in twelve languages, according to the plan outlined above.
2. That the writing of the original text of this dictionary (in German) be intrusted to _____, and the writing of the parallel texts in other languages, or the responsibility thereof, be given to _____.
3. That the relations with collaborators for the compiling of this information book be intrusted to the bureau of the "Conseil international pour l'exploration des mers du Nord," which institution will have the right to fix the time for delivering the papers by collaborators in each country, and will provide for unity of form for the whole, bearing in mind, however, that the manuscript of the book, quite ready for printing, shall be presented to the next congress for approval.

The PRESIDENT. Ordinarily communications of this kind, that involve recommendation for indorsement, are referred to the committee on resolutions. The paper, however, may be discussed, if you wish, or the chair will entertain a motion to refer to the committee on resolutions.

Lieutenant DE AQUINO (Brazil). I think we should put in the Portuguese language, which I believe is being spoken by more than 30,000,000 people, and therefore ought not to be left out, although putting in another language would raise the number to thirteen, which may not prove very lucky. I would like to present the suggestion that to the twelve languages be added the Portuguese language.

The PRESIDENT. Will it serve the purpose if the secretary-general of the congress is instructed to so communicate with the editor of the dictionary?

Lieutenant DE AQUINO. Yes, sir.

The PRESIDENT. That will be sufficient?

Lieutenant DE AQUINO. Yes, sir.

Mr. O. T. OLSEN. This subject is a matter to which I have given a great deal of thought and at which I am working. The unification of fish names, I think, is a very desirable thing, and we ought to have done it at this congress. To do it here is impossible, for when we disperse to-morrow what work we have done is finished, and there is nobody to carry it on for the next three years.

I may say with regard to the different languages suggested for the dictionary, to my way of thinking it would not be desirable to have all those languages in one book, inasmuch as if I read the book in English, the Spanish or the Japanese language is no use to me, and there would be so many sections of the book simply lying dead, not being used. Now, I have a different scheme, and that is to have one book in one language, say in English, and when compiled to have it translated into the different languages. I would have a number for each sentence or for each subject, which could be referred to; this number should correspond in all the languages, so that if, we may say, a Russian wishes to get the same meaning in Russian as in English he would simply have communicated to him the number and the reference number, and then he can read in his own language. Then there would be no necessity of having so much matter within the covers of the book used. That is one thing.

The next, Mr. President, is that I am at present compiling a work for the fishermen—that is, the deep-sea fishermen. The subjects to be treated are navigation, the rule of the road, oceanography, fish culture at sea, a little natural history, just sufficient for the fishermen in their calling; and there will also be a chapter on steam, sufficient for them in case of breakdown to repair their engines and get to port, and a few matters like this which I have compiled and I am compiling. And I should be very glad if anyone present who hears me and who feels inclined would supply me, for insertion in that book, any kind

of information respecting any of those subjects that I have mentioned. This book is called for. It has been called for for several years. I have issued two editions of *The Fishermen's Practical Navigator*, of which this will be the third, brought up to date; and it includes steam fishing vessels, with all the modern improvements and gear. I should be very pleased to hear from anyone who is for progress in the same direction.

The PRESIDENT. A motion to refer to the committee on resolutions is in order, unless there is further discussion.

[The motion was made and duly seconded.]

The PRESIDENT. The motion has been made and seconded, and if there are no objections the chair will so refer.

The paper by Mr. William P. Seal, namely, "Fishes in their Relation to the Mosquito Problem," is a paper that the chair has received several requests for, and if Mr. Seal is here, or if there is some one here who will present the paper for him, that paper will be the one now called for on the programme. [After a pause.] Mr. Seal is in attendance, I am informed, but he seems to be out at the present moment. [For this paper see pages 831-838.]

Then the paper by Professor Wilson, which is "On the Development of Sponges from Tissue Cells Outside the Body of the Parent," will be called for, and I shall ask Doctor Moore if he will kindly introduce the discussion on this paper when the reading is finished.

[Prof. H. V. Wilson presented his paper, which appears on pages 1265-1271.]

The PRESIDENT. Are you willing to leave these specimens on the table, Professor Wilson, for a little opportunity to examine them? Perhaps Professor Wilson will be willing to meet you at the close of this session for a few moments, and explain the preparations to those who care for a special explanation.

Doctor Moore has asked me to state that he has a number of things to attend to just now, and that he would prefer not to undertake to discuss the paper of Professor Wilson. Nevertheless, he would like me to state that in the basement of the building of the Bureau of Fisheries there is an exhibit that shows the process of budding and growth of commercial sponges. You will find an exhibit made there which represents the work that the United States Bureau of Fisheries has done during the experiments for some years past in this most important matter.

Are there other questions to be asked of Professor Wilson from the floor? If not, I shall ask Doctor Evermann to present in abstract the paper, "Experiments in the Artificial Propagation of Freshwater Mussels," by Prof. George Lefevre and Prof. W. C. Curtis.

Dr. B. W. EVERMANN (U. S. Bureau of Fisheries). Mr. President and gentlemen, I regret very much that neither Doctor Lefevre nor Professor Curtis has found it possible to be present at this congress. We all felt, however, that something should be said regarding certain experiments which they have been carrying on. I shall not present the formal paper which they prepared, but

shall give you a more or less rambling talk concerning some of the questions, at least, which are dealt with in their formal paper.

[The paper by Professors Lefevre and Curtis will be found on pages 615-626.]

Mr. PAUL NORTH (Ohio). Will you kindly explain in reference to the colored buttons?

The PRESIDENT. Mr. North asks a question. I learn that those which are discolored—are not uniform in color—are smoked by putting into nitrate of silver, and made into what is called the “smoky pearl.” There is a small demand for buttons of other colors, and those are produced by using aniline dyes, by which they can be made red, blue, and the different colors obtainable in the aniline dyes.

The members may have noted the various exhibits that have been brought to the congress, with certain papers submitted in competition for prizes, and material that has been presented here by those who have been good enough to contribute to the programme. This material has been arranged in front of the desk, and those who are interested in discussing it will kindly come to the desk at the conclusion of the sessions. And I shall ask those who have contributed the material to please install themselves as demonstrators of the respective exhibits.

Will the honorable Mexican minister, Mr. José F. Godoy, please come to the platform? [Applause.]

Mr. GODOY. Mr. President and members of the Fourth International Fishery Congress, it is with great pleasure that I address you these few words to inform you that the Government I have the honor to represent here has felt great interest in, and attaches great importance to, the meeting of this congress. The discussions held at these sessions and the conclusions to be determined upon will no doubt greatly aid the Mexican Government in framing ampler regulations on the subject of fisheries, and I hope will also serve to establish measures looking to the preservation and increase of our fish industry.

Permit me, in the name of President Porfirio Diaz, whose progressive and enlightened administration of affairs is well known to most of you, to present you his greetings and his best wishes for the success of your important labors. Permit me also to inform you that the Department of Promotion, which has the subject of fisheries under its charge in my country, and which at present is directed by Minister Olegario Molina, a most active and efficient cabinet officer, is looking to the results of the labors of this congress as a guide for its future work along the lines that may be pointed out in the deliberations of this international gathering.

To me, who have had the privilege of residing some time in Washington, the cordiality shown in the reception accorded to the members of this congress here has not been surprising. We all know the well-earned reputation for courtesy and hospitality which the inhabitants of Washington enjoy, and therefore it was

to be expected that the welcome extended in this city to the members of this congress would be, as it has been, most warm and cordial.

The well-chosen words with which the Acting Secretary of State, Mr. Adee, received the delegates, and the timely and thoughtful address of the Secretary of Commerce and Labor, as well as the hearty manner in which Commissioner West extended the city's welcome, were but a forerunner of the enthusiastic way in which this congress was to be treated. No less hearty was the reception accorded to its members by His Excellency President Roosevelt, the honored head of this nation, whose warm hand grasp and frank and eloquent utterances were indicative that he was in hearty approval of the labors of this congress. These indications, as well as the interest shown in the work of this convention by the enlightened press of this city, and the facilities and advantages afforded by the well-established libraries and museums of Washington, no doubt have contributed to spur on the investigation and resolution of the subjects here for discussion.

And let me not forget, among the advantages enjoyed by us, the timely election made of our president and secretary. I know full well that Mr. Bumpus and Mr. Smith are not fishing for compliments, but I can assure you that we gathered in our nets the best president and secretary that we could have selected.

Under such auspicious circumstances the work of this congress has gone on, and when such work shall be finished I think that all of you will say with me that we are proud to be members of the Fourth International Fishery Congress, and to have contributed, even if it is but by our close attention and hearty applause, to the far-reaching and important labors of those who organized this gathering and carried it on to a successful conclusion.

Thanking all of you for your kind attention, as also for the undeserved honor of having been selected as one of your vice-presidents, I again convey to you Mexico's greetings and good wishes.

The PRESIDENT. Secretary-General Smith has a communication from Ecuador.

The SECRETARY-GENERAL. I have had placed in my hand by Señor Don Esteban F. Carbo, who represents the Republic of Ecuador, a communication, which, with your permission, I will read:

HONORABLE DELEGATES: As delegate for Ecuador to the International Fisheries Congress, I have the honor to call your illustrious attention toward a new and hitherto unknown field of activity for the interesting, valuable, and productive industry of fisheries. I speak with reference to Ecuadorian waters, and especially of the Colon Archipelago (Galapagos Islands), which belongs to the Republic of Ecuador and is situated about 500 nautical miles from the coast of said country, and enjoys the old and well merited reputation for its magnificent geographical position, its splendid climate, smooth seas which surround it, and for the abundant and choice resources in turtles, grouper (known by the native name of mero), and infinite and rich varieties of other fish. The Government of Ecuador is ready to extend all facilities and its decided support to the enterprise or enterprises which will propose to dedicate themselves to the fisheries of the

archipelago, which could be converted into one of the most productive industries in the world.

The location of the islands of the Colon Archipelago, as I expressed before, could not be more advantageous to the fishing industry, on account of the facilities to ship their products to all markets. The opening of the Panama Canal will augment those facilities, providing at the same time the advantage of maritime commerce, because a large number of vessels will stop on their voyages to and from North America, South America, and Australia.

The circumstance that the ocean which surrounds these islands is tranquil all the year round, hurricanes and fogs being unknown, and the undisputed mildness of one of the best climates known give to the islands of the archipelago of Colon an exceptional opportunity for establishing important fisheries with indubitable benefit for the persons who will undertake it and for the whole world which will enjoy the excellence of those products. Well-known travelers have made careful studies of the Colon Archipelago and they are all consistent with the datum that I submit to the congress.

Small colonies can be established because the soil is rich, the ports are good, there is abundance of wild cattle, and the villages that will be erected by those interested in fishing may become important cities, there being all the facilities for living. Salt mines may be worked on the islands to salt the fish, and the nearby coast of Ecuador has numerous mines that are now in operation.

With the few undetailed facts that I give, gentlemen, I am sure that you will be convinced that the fishing industry has a new horizon and that the Archipelago of Colon is destined to be one of the most important centers of universal activity in such an important branch of the industries.

The eminent Dr. Teodoro Wolf in his "Geology and Geography of Ecuador" says:

"The islands of Galapagos lie 9°, or from 500 to 600 nautical miles, from the Ecuadorian coast and are traversed by the equinoctial line. The principal mass of the islands, including the 5 largest ones—that is to say, Albemarle, Indefatigable, Narborough, James, and Chatham—lies between said line and the first austral degree; only the 3 small ones—Abingdon, Bindloe, and Towers—are north of the line, and 2 not much larger—Charles (Floreana) and Hood—south of the first austral degree. There are commonly 13 islands, adding to the ones I have mentioned those of Barrington, Duncan, and Jarvis. Furthermore, there are several smaller keys which surround the large islands. The longitudinal area of the archipelago, from Chatham to Narborough, measures 53 leagues, and the latitudinal from Floreana to Abingdon, 41 leagues, in a manner such that these islands are found scattered over an area on the Pacific Ocean of 2,000 square leagues, nevertheless reunited in one body they would have an area of 240 square leagues of solid ground. Albemarle, the largest, has 138 square leagues. In the inland region of the islands the ground is covered with a turf that is green the year round. The thickets offer a large variety of trees and shrubs of equal magnificence and verdure."

Doctor Wolf, in speaking of the colonization of the islands, calls attention to the fact that the fishing along the coast of the islands could be elevated to a plane of great importance, which would be a fountain of richness to the colonizers and which would give occupation to a numerous population. There would be in addition numerous subordinate industries, such as the taking of the oil from turtles and terrestrial iguanas.

On the question of harbors and anchorage, Lieut. Commander Z. L. Tanner, U. S. Navy, commanding the United States Fish Commission's steamer *Albatross*, says: "There are no landlocked harbors in the Galapagos, but anchorages are found near most of the islands, where a vessel may lie usually with perfect safety. Indefatigable Island affords good anchorages from Conway Bay along its northern side to the Seymour Islands; there are places also along the northeast side where good protection may be found. Chatham Island has several good anchorages. Wreck Bay is the most important, as it is the seaport of the Hacienda del Progreso, a large sugar plantation. It is open to the westward, but particularly protected by Schiavoni reef; there is usually a small swell, but

landing or lightering is seldom interrupted. Stevens Bay is superior as a harbor, has more room, and has a snug cove which forms an excellent boat landing and harbor for small craft or lighters, its smooth beach affording excellent opportunity for hauling them out for repairs. Post-Office Bay, 4 miles to the north of Black Beach Road, is one of the best anchorages in the Archipelago. It is well protected, with moderate depth of water and good holding ground. Landing is practicable at all times." There are many other anchorages on these islands too numerous to be mentioned in this brief report.

Commander Tanner, commenting on the strategical value of the archipelago, goes on to say: "The strategical value of the islands is increasing with the advent of modern cruisers which are entirely dependent upon steam as a motive power. They are in direct route from San Francisco to Callao and Valparaiso, and, in the event of the completion of the Panama Canal, they would lie in the route to Australia and New Zealand and would become a regular port of call for steamers plying between those places. A glance at the map will show the location of the group with reference to the coasts of North, Central, and South America, and the value of a coaling station at that point, nearly midway between San Francisco and Lota, the southernmost coaling port in the Pacific, becomes at once apparent. A modern cruiser could make the run direct from San Francisco to the Galapagos, fill up with coal, procure fresh provisions from shore, and reach the South American coast with a good supply of fuel, avoiding the longer and more expensive route via Acapulco and Panama. The location of the islands in the region of the southeast trade winds is particularly favorable for the delivery of coal from Australia, Lota, or even from the Atlantic coast. It could be laid down there at much less cost than at Acapulco or Panama."

I ask, therefore, of the honorable delegates of the different countries here represented that they be so kind as to call the attention of their countrymen toward the fisheries of the Archipelago of Colon (Islands of Galapagos) in the certainty that they will reap great rewards.

The PRESIDENT. Professor Vinciguerra has a communication to present to the congress.

Prof. DECIO VINCIGUERRA. Before this congress adjourns I think it proper to call its attention to a subject which was discussed at the International Fishery Congresses of St. Petersburg and Vienna, namely, the timeliness of an international oceanographic exploration of the Mediterranean Sea in the interest of fisheries. The same question was debated at various international geographic congresses, and recently at the Geographic Congress of Geneva. I had the honor to report on this subject on behalf of the Italian Geographical Society. The importance of this proposition was recognized by the Geneva Congress, which has intrusted its consideration to a committee, whose presidency has been offered to the Prince of Monaco, whose valuable contributions to oceanography are well known. On this committee should be represented all nations of the Mediterranean shore, the Adriatic and Black seas included. I think it superfluous to tell this congress the reasons why the fishery interests of the Mediterranean make this exploration impellent, because it is generally known that whatever legislation there may be on the matter, and especially that having an international character, can be based only upon the knowledge of the life history of fishes and on that of the physical conditions of the waters where they live. I confine myself, therefore, to the proposition that this congress, reaffirming its former votes, shall approve the proposed exploration.

The PRESIDENT. You have heard this most interesting communication that brings to us business that was begun three years ago. What is your pleasure in regard to the communication that has been thus submitted?

A MEMBER. It is a matter of very great importance, and I move you, sir, that the communication be referred to the committee on resolutions.

The PRESIDENT. Is the motion seconded?

[The motion was duly seconded.]

The PRESIDENT. The motion has been made and seconded. The matter is now open to discussion, if you care for discussion. If the chair hears no request, then—

Mr. CHARLES E. FRYER. I would like to ask Professor Vinciguerra whether it is proposed that the explorations of the Mediterranean in regard to the interests of the fisheries should be limited to the powers which adjoin the Mediterranean, or whether other countries would participate. I raise the question for the reason that quite recently some English fishing vessels have actually been fishing in the Mediterranean, having been tempted to try their fortune on the eastern side of the Straits of Gibraltar, and if such practices were to extend it would undoubtedly enlarge the sphere of inquiry in which any such committee as is proposed would be concerned. All the powers that are likely to take up fishing operations in the Mediterranean should, it seems to me, have a share in such a scheme of investigations as is proposed.

Another point to which I should like to call attention would be the great desirability of especially directing any investigation to those problems which immediately affect the interests of the fisheries. This is a fishery congress, and although we all fully recognize that fisheries involve questions of interest in many different sciences, still our chief interest is that of fisheries, and I would suggest that, just as in the case of the North Sea investigations, the international council for which is now sitting in Copenhagen, the first and immediate points for consideration should be those which affect the future industrial welfare of fishermen and fisheries.

The PRESIDENT. The stenographer has taken down the remarks of Mr. Fryer, and these remarks will become a part of the published reports of this congress. If there is definite action on the part of the congress required by Mr. Fryer, the chair will be very glad to entertain any motion to that effect; and will Professor Vinciguerra kindly reply to the queries that were put to him?

Professor VINCIGUERRA. It is the intention of the committee which was proposed to invite all nations that have interests on the Mediterranean to take a part in these explorations, and three or four members have already been indicated, because their countries were well represented at the Geneva congress. All the other nations, not only of the Mediterranean, but also in the Adriatic and Black seas, will have a representative—Roumania, Russia, and also Germany, because Germany has a station on the Adriatic Sea; and the representative of Germany at the congress in Geneva made the proposition that also Germany

must have a member in this committee. And I suppose, for instance, England has great interests in the Mediterranean, and without doubt England will be entitled to take a part in this enterprise.

Our thought is to promote the exploration of the Mediterranean in the interest of the fisheries. Then it is clear that the fisheries interests may be the main influence that may be regarded in these explorations.

I hope that Mr. Fryer now fully understands.

[The motion before the congress was carried, and the communication of Professor Vinciguerra was referred to the committee on resolutions.]

The PRESIDENT. I have been requested to read the following communication from those who have in charge the luncheon that is to be served to-day by the Alaskan Packers' Association, as a compliment to the congress. [Communication read.]

Now, one other matter: There are still some who, because of their interest in the programme as rendered in this room, have forgotten to register, and you are again asked to kindly register and become organically connected with the congress.

Then there are some who have signified their intention, by handing in their names, to attend the subscription banquet this evening, and who have not yet received the cards of admission. It would be too bad if any member of the congress should come to the Hotel Raleigh this evening, after having prepared himself for the banquet, and find that although he had on a "wedding garment," nevertheless "he could not enter in." [Laughter.]

Is there other incidental matter to come up before we proceed with the reading of papers? There are a few of these [indicating] badges here for those members who care for them.

Doctor Field, will you kindly give an abstract—the substance—of the paper submitted by H. C. Rowe? Mr. H. C. Rowe is at the head of one of the largest oyster concerns in America, and he entertains the members of the congress on our arrival in Fall River on Tuesday morning next. One of Mr. Rowe's steamers (he has a large fleet of these steamers, of course) will meet us there at 8 o'clock on Tuesday morning and will take us to one of the large oyster beds, and that steamer will then show the method of steam dredging and oyster culture that is carried on in Narragansett Bay, a method which is used throughout Long Island Sound and in the extensive beds still farther south. Doctor Field is quite well acquainted with this work in Narragansett Bay. The paper is rather long, and Doctor Field will give it to us in abstract.

Dr. GEORGE W. FIELD. We must all regret the absence of Mr. Rowe, who would be able to present this to you in a better shape than I can.

[The paper by Mr. H. C. Rowe was then presented in abstract; the full paper appears on pages 259-267.]

The PRESIDENT. There is some probability that the various committees on award will be prepared to make their reports in time to be read at the conclusion

of the luncheon this noon. We hope that these committees' announcements may be made at that time—at the conclusion of the luncheon in the banquet hall.

The next paper is one that has been prepared by Professor Reighard, and Doctor Ward has consented to give it to us in abstract. Is Doctor Ward here? If Doctor Ward is not here, I shall ask for the paper by Mr. Seal. Is Mr. Seal here? [No response. This paper is printed on pages 831-838.]

[At this point Professor Vinciguerra was invited to the chair.]

Vice-President VINCIGUERRA. We will, then, now hear the paper by Dr. S. E. Meek, of the Field Museum of Natural History, Chicago, entitled "A Study of Lakes Amatitlan and Atitlan, Guatemala, with Especial Reference to Fish Culture."

[Dr. Meek's paper was then read.]

Vice-President VINCIGUERRA. I now have pleasure in introducing Hon. Gifford Pinchot, Chief Forester of the United States Department of Agriculture. [Applause.]

Mr. GIFFORD PINCHOT. Mr. President, ladies, and gentlemen, it is a real pleasure for me to foregather with a body of people interested in fishing. I should like to assure you that the old proverbial question, "What would you rather do or go fishing" has but one answer with me: I would always rather fish; and I have accumulated in the course of my life a certain number of fish stories, which I shall not inflict upon you here. I know that this is an economic congress, and in what I have to say I want mainly to take the economic point of view.

The Forest Service is fortunate in having a very direct relation to the fisheries question. It has charge of the area which includes the headwaters of the streams which water about two-thirds of the United States; and through the 2,500 or 2,600 men who compose its force the opportunity is afforded of helping in the preservation of food and game fishes, an opportunity, I should like to add, its officers very greatly prize.

You are well aware that questions of game and fish are reserved to the states, and national officers have little to do with them, outside the national game reserves and national parks, except as they may be also state officers. A majority of the rangers in the national forests have in fact become state officers, for the purpose of protecting the fish and game, and we are doing what we can to enforce state laws and prevent the indiscriminate slaughter of both fish and game; and, I think I may venture to say, with some success.

I suppose there are few questions which more completely show the interrelation of the different natural resources of a country than does the fisheries question; and that in its relation not to the forests, but to other resources as well. I suppose the majority of the types of fresh-water fish depend directly on the conservation of the forests, if not for the very existence of the species, at least for its plentiful distribution. That is why the Forest Service has so direct a relation to the fisheries question; and in various parts of the country,

especially in the national forests in the West, at least a good beginning has been made to protect the streams upon which fresh-water game fish depend.

But it is not by any means enough to protect the forests; other things must come in also. Where we have protected the headwaters of a stream with forest cover and are maintaining it, even then there are very serious dangers connected with other uses of the land and water which appeal directly, as I should imagine, to a congress such as this. For example, where water is used for power a great many fish may be killed by the physical arrangement of the apparatus. In the same manner, enormous numbers of game fish perish from time to time because of the use of the water in which they live for irrigation, and the lack of a proper system of protective headgates to keep the fish from getting into the irrigation ditches.

I believe that few things will have a more beneficial influence, in the end, on the fisheries of the country than the demand for clear water in our streams for city and town supply. The fishery question is thus immediately connected with one of the great fundamental problems of conservation in the United States, which is to prevent soil wash and so to maintain the fertility of the soil on the farms.

As an illustration of the unity of this great conservation problem, which has taken so firm a hold on the people of the United States since it was first propounded by the President, I think the fisheries question is one of the best.

It is a little difficult to connect sea fisheries with forest preservation, and yet even in places that connection exists. The condition of the harbors and the lower salt reaches of the great rivers is directly affected by the condition of the forest cover at the head waters; and thus even here, while the relation is by no means so direct, it still exists.

Therefore—and this is the substance of what I wanted to say to you today—it seems to me that every single one of the interests that are concerned with any phase of this great conservation problem is also concerned with the rest of it. You are intimately concerned with forests, water power, irrigation, soil conservation, and a number of others. All of these interests in their turn are concerned with the preservation and protection of the food and game fish.

Many of us have been seeking for definite results on definite lines, with a good deal of lack of success, and for a good many years we have been working too much alone. If the great question of conservation is a single question, then it seems to me the natural remedy in this age of combination lies in the combination of the interests of all of us who need to get the same things done.

I have been asking and getting for the National Conservation Commission the heartiest and most vigorous support and cooperation for the one central object of conservation on the part of a very large number of associations that are interested in specific and individual parts of the great whole. Your help is greatly needed. You are concerned with the business and common-sense use of foresight in providing for things which you foresee the need of, as well

as in preventing or repairing losses which may happen or have happened. The same spirit of looking ahead, the use of the same kind of prudence and good sense that a man employs in dealing with his own business affairs, is the key to the solution of your problem. So it is of the forest problem, the water-power problem, the soil-erosion problem, the navigation problem, which affects, of course, your work most intimately; and all the other great individual problems concerned in this greatest of all movements.

So I have wanted to bespeak for the conservation movement the sympathy and good will of the fisheries men just exactly as the fisheries men should have and do have the sympathy and good will and cooperation of the forest men; and I should be very glad indeed if in any way whatever the Forest Service can more efficiently promote the work you have in hand. I should welcome any assistance or advice you may be willing to give for that purpose.

Thank you very much for your attention.

Mr. S. G. WORTH (Superintendent U. S. Fisheries Station, Edenton, North Carolina). I have listened attentively to the papers and discussions in the sessions of this congress, and there is nothing I have heard in these meetings that has interested me more, or that has seemed to be a broader-gauged question, than the one alluded to by the last speaker. I have been in fish-cultural work for something like thirty-one years, and acquainted with the Piedmont section of North Carolina during that time. It has been painful to me for many years to see the ruin that has taken place in the streams of that section; and when I recently rode through the State from Cape Lookout to Asheville, it occurred to me that I ought then to sit down and write a newspaper article, encouraging the people connected with the state government to take some steps against the washing away of the lands. This last speaker has asked for some suggestion by which the Forest Service could aid us, and I may make this suggestion to him, that in Wake County, N. C., which is the site of the state capitol, there is a species of hillside ditching carried on by the cotton and corn farmers of that country which obviates almost entirely the washing away of those lands. It is a perfected system, which has been in existence there for years. I lived for a year on the farm of the late Jesse F. Taylor, where I saw that great land improvement which he had effected, and where he had stopped all the land wash; and I became acquainted with the principles of that hillside ditching; and I recommend to the Forest Service the study and extension of the system of hillside ditching referred to, as a universal benefit to fish culture in the United States. I would close my remarks by saying that it is one of the simplest and cheapest operations that I have ever seen, and may be done entirely with a 1-horse turn plow and a long-handled shovel.

The PRESIDENT. Are there others who will make suggestions or remarks? If not, the session will adjourn until 2.30 this afternoon.

Thereupon, at 12.30 p. m., the congress adjourned.

At 1 o'clock the members of the congress were tendered a complimentary salmon luncheon by the Alaska Packers' Association in the banquet hall of the New Willard Hotel. Mr. C. W. Dorr, vice-president of the association, presided at this function, and remarks were made by Commissioner George M. Bowers, Hon. John M. Allen, Hon. William R. Wheeler, Mr. Charles E. Fryer, Mr. H. C. Bliss, Mr. John H. Wallace, jr., Prof. Edward E. Prince, and Dr. P. P. C. Hoek. At the conclusion of the luncheon Prof. E. A. Birge submitted the report of the committee on competitive awards (for which see page 69).

AFTERNOON SESSION, FRIDAY, SEPTEMBER 25.

NEW WILLARD HOTEL.

The congress was called to order by the president at 3.15 o'clock.

The PRESIDENT. Will the committee on resolutions kindly submit resolutions for the general adoption of the congress? We shall now listen to the illustrated paper by Prof. E. A. Birge on "The Gases Dissolved in the Waters of Wisconsin Lakes."

[Professor Birge's paper, followed by discussion by Mr. J. J. Stranahan, Dr. Oscar Nordqvist, and Professor Birge, appears on pages 1273-1294.]

Mr. M. G. SELLERS (Pennsylvania). Mr. President and gentlemen of the congress, it is not my purpose to in any way discuss the scientific feature of Professor Birge's paper, but its presentation brings up a very serious question, which I thought it might be advisable to express to you to-day. I appear before you only in the character of an angler. It is the function of the fish commissions to populate inland lakes of the various states. Inland lakes, I take it, concern the angler more than they do the commercial fisherman.

Has it ever occurred to you that outside of a philanthropic effort on the part of the owners of the land bordering such lakes, the general public have to either pay toll or request the privilege of going in and angling for what the state has planted in those waters? I consider that this is a question largely concerning the anglers; but, nevertheless, it has a great deal to do with the question of food and angling, in so far as it represents the great bulk of the money distributed through a state by the sportsmen who seek that kind of pleasure. In my own State of Pennsylvania we have not solved that problem. I know of no state yet, in the whole United States or in foreign countries, which has solved satisfactorily the problem of providing means of ingress and egress for the angling public to inland lakes, for the great privilege of enjoying fishing. I had intended to bring this subject before you in the shape of a paper, because I think it is a burning subject, in that when the state through its departments of a public nature propagates fish, to plant them in the waters of the inland lakes, as I have described, the general public should, I feel, have some means of ingress and egress that they may partake of what the state has done primarily for their benefit.

I do not feel that I ought to take up more time in discussing a problem on which I might tire you, but it is a very serious question not only to the State of Pennsylvania, as I say, but to all states—the free right of trespass to partake of what is hatched in the hatcheries for the benefit of the general public of the several states.

Mr. JOHN J. PEW (Massachusetts). Mr. Chairman, in our state you can not exclude the public from fishing in a pond of, I think, 10 acres.

Mr. SELLERS. It is 20 acres.

Mr. PEW. In New Hampshire, I think, a man owned a lake and tried to keep the public out of it. The inhabitants were very angry, and they went through the fields and entered that lake; and they carried the matter to the superior court, which decided that by that law the inhabitants had the right to fish in that lake, and it could not be shut up to the people—that was either in Maine or New Hampshire.

Mr. SELLERS. I would suggest that in Pennsylvania, as an angler, my first duty, about twenty years ago, was to bring about a free right for the public to fish streams in which brook trout were planted by the state. Those streams in their original nature were created navigable by acts of the assembly, and the right of fishing was never mentioned in those acts, which start away back in 1814 and continue up to the year 1870. After many years of hard effort, I finally succeeded, in 1901, in the State of Pennsylvania, in getting through the legislature a bill which accorded to the general public the right to fish those navigable streams.

It may be of great interest to you to know why this is a burning question to the State of Pennsylvania. I shall describe a case that has been decided against the Commonwealth, in so far as it refers to the public fishing in those waters. We have always assumed—in fact, case after case, not getting further than the local magistrate, has been decided always in favor of the angler. Usually when a stream is well stocked by the state and the fishing becomes good in our thickly populated eastern sections, it is a misfortune that about the first thing to happen is that someone, or a combination of persons having good success, think it a very wise thing to lease the water and have it all to themselves. That occurs frequently, with the result that one stream in particular, in a section of Pennsylvania, which was declared navigable by act of assembly in the year 1814, was subjected to a test. An angler went into that creek. In order to insure that he would not trespass on the riparian right of the owner, he walked down the country road and got into the creek from the bridge, and was careful to keep in that creek to the point of the highway mark. He was arrested, brought before the magistrate, and was fined for trespass. Representing the Pennsylvania Fish Protective Association, we appealed that case and took it to the superior court; and without taking any more of your time on a question which is not quite scientific, we were absolutely beaten, because the constitution of Pennsylvania

is declared to be greater than the acts of the legislature, in that there was no compensation given to the owner of the land, hence he had a free right to the positive control of that creek, not only along its highway, but along the bed of the creek.

Gentlemen, I can not begin to tell you what I feel for the angler of Pennsylvania. I fear that public trout fishing in the State of Pennsylvania will some day become a very, very expensive luxury, due to the fact that at the present time, unless we go to the Supreme Court of the United States, we do not know what that decision might be. We do not know whether we have any public fishing waters for trout in the State of Pennsylvania; and my heart goes out to the anglers who formerly fished those waters and who may in the future find it very expensive to get a little trout fishing.

Dr. TARLETON H. BEAN (New York). I do not know whether I exactly understood the gentleman in his remarks about the State of Pennsylvania in regard to providing for the public fishing, but I ought to say that in New York, which appropriates, I think, about as much money for fish culture as any other State of the Union, no streams except public streams are provided with fish. It is not possible for a private owner to secure fish from the state; and when a stream has been stocked with fish by the state it becomes public water. There were 2,000 streams stocked during the last year with brook trout alone, and every one of those streams becomes a stream open to the public for fishing.

Mr. A. KELLY EVANS (Canada). As some reference has been made to the State of Maine, and I do not know that the state representative is here, I might point out that in that state, which undoubtedly has proved the most successful in turning angling and sport into an asset of great wealth to the state, amounting last year undoubtedly, from its statistics, to twenty-five millions of money brought into the state, its system provided this: That in any lake called a big pond, of a greater area than 10 acres, anyone can go and fish, even if an individual owns the land completely surrounding it, unless that land is cultivated. If it is not cultivated and is, comparatively speaking, wild land, the only action the owner can take is to bring the man who comes in and fishes on the lake before the courts; and the owner must prove damage in his passing through that land; but he has no right to prevent that man from fishing in that lake. And so universal has that custom become in the State of Maine that no attempt is made by private owners to control either lakes or streams. Where this works out to the advantage of the state and to the fish culturist is this, that the sympathy of the public is entirely with the fish culturist and with the whole system, in so far as no private ownership is allowed. I may say, Mr. Chairman, that it has been because of the wonderful success of Maine—the money that Maine has shown to exist in this system—that I myself have been successful in arousing an agitation in the Province of Ontario, and on account of always speaking and voting for holding the waters open to the public I have thereby received the

sympathy and support of the general public. And we find in Canada this, gentlemen, and I shall only take one moment to tell you so, that the greatest difficulty in the world exists in protecting the rights to the salmon river owners, because when we attempt to carry out the laws of the country as to the placing and lifting of nets and so on in the mouths of the rivers, we feel that after all the public is against those actions by the state, on account of the streams being owned by private individuals. And I take it that on a broad principle, as far as game fishes go, it is undoubtedly best for the whole body politic, for the fish culturist, and for everybody concerned to keep the waters absolutely open to the public.

The PRESIDENT. This has been a congress of young men. There is one young man here who is twice the age of some of us in years, but who has been identified with the subject of practical fish culture in America from its inception. He has been a friend of every ichthyologist and every ichthyologist in America has to-day a feeling of intense devotion for him. The chair therefore feels that the concluding session of this congress should properly be turned over to Dr. Theodore N. Gill. [Great applause.]

Dr. THEODORE N. GILL (Washington, D. C., assuming the chair). Mr. President and gentlemen, in order to insure conciseness and to avoid digressiveness, I have put my thoughts in writing, and without further preface I will read a paper I have prepared embodying "A Plea for Observation of the habits of fishes and Against Undue Generalization."

[This paper, with discussion by Prof. E. E. Prince, Dr. Tarleton H. Bean, Dr. Hugh M. Smith, and the author, will be found on pages 1059-1069.]

The ACTING CHAIRMAN. If there is no further discussion, the report of the committee on resolutions is now in order. Professor Prince is the chairman of that committee. Will Professor Prince give us the report?

Professor PRINCE. It is unnecessary to say anything about the work of this committee. I shall just read the resolutions; that is all that is necessary. The first resolution we had before us and which we now present to the congress is one which would express the views of the congress upon three important matters, and I shall just read word for word the resolutions, as we present them. I presume it is not necessary to have separate action on each resolution.

The ACTING CHAIRMAN. The chair presumes that it is not necessary to act upon each of these resolutions separately. If there is no objection we shall consider them all together and act upon them at the end.

Professor PRINCE. I shall proceed to read them all, Mr. Chairman.

[The resolutions were here read. See page 67.]

The ACTING CHAIRMAN. You have heard the resolutions with respect to the different matters. Have you anything to say? Have you any motion to make or any further remarks? The resolutions as you have heard, gentlemen, are before you now for ratification. All in favor of these various resolutions will

please signify by the usual manner, "Aye;" all opposed, "No." No objection being offered, the resolutions that you have heard have all been accepted.

Professor PRINCE. I should say that there is still one addendum, and that is in regard to the international condensed dictionary of technical terms, which Mr. Borodine, of Russia, has proposed. The congress has had this matter before it, and I need not read the somewhat lengthy resolutions which Doctor Borodine suggested to the congress, but the committee on resolutions were disposed to favor this proposal; and perhaps, Mr. Chairman, it might still be left to the congress to decide what to do with it.

The ACTING CHAIRMAN. You have heard the proposition of the gentleman, and the question is what shall be done with this—that is, whether, for example, it should be referred to the permanent commission or whether it should be acted upon immediately. A motion to that end is now in order. What is your pleasure, gentlemen?

Doctor HOEK. I suggest the wisdom of laying the resolution in the hands of the permanent commission and not undertaking to reach a decision on it at present.

[The motion was duly seconded.]

The ACTING CHAIRMAN. You have heard the motion by Doctor Hoek. It is proposed that this resolution should be referred to the permanent commission and that no action be taken by the congress for the present. All in favor of this motion will please signify by the affirmative sign; all opposed, "No." It is carried, and the resolution is so referred.

It is suggested by the secretary that Professor Ward will present the paper by Professor Reighard, for which a prize has been awarded.

Professor PRINCE. One moment. There is another resolution.

The ACTING CHAIRMAN. Doctor Prince will offer another resolution.

Professor PRINCE. Doctor Vinciguerra has just brought before the congress a resolution which had been referred to the committee—a resolution on the matter which was discussed at the international fishery congresses at St. Petersburg and Vienna, namely, an international commission on oceanography and exploration of the Mediterranean in the interest of fisheries. The scope of the resolution has been given by Doctor Vinciguerra, and the committee are favorable to that resolution.

The ACTING CHAIRMAN. If there is no demand for the reading of this resolution, it will be considered as it has been enunciated. There apparently being no demand, the question is before the congress. All in favor of adopting this resolution will please signify in the affirmative; all opposed, "No." It is carried. We shall now proceed to the regular business.

Prof. HENRY B. WARD. I find myself in the agreeable position of being called upon to read a paper by my friend and colleague, Doctor Reighard. It would seem like cruelty to fishermen, if not to other animals, to inflict on you a long

paper; consequently, although this is one that has been awarded a prize by the committee on awards, I shall take the liberty of cutting it in such fashion as to present the essential features and leave out the other matter which is not necessary to your comprehension at the present moment. I consequently pass over the introduction, which deals with the work of all previous investigators, including our chairman, Doctor Gill, and shall proceed at once to the second section of the paper, the general principles involved in the field study of fishes. Possibly I neglected to mention the exact title, "Methods of Studying the Habits and Recording the Life Histories of Fishes."

[This paper, read in abstract, is printed in full on pages 1111-1136.]

The ACTING CHAIRMAN. The chair thanks Doctor Ward for the distinct and excellent rendition that he has made of Doctor Reighard's paper. The donor of the prize, assuming that the entire memoir is of the same character as the part read, thinks that the award was amply justified, and is very much gratified that such an excellent paper has been produced. In respect to the species whose life history has been recorded it would, however, be well, I think, if Professor Reighard would add that the same characteristics of nest building are manifest in the other species of the genus *Semotilus*; that is, in *Semotilus bullaris*. It has been denied that *Semotilus bullaris* exercised this function of parental supervision. Doctor Abbott many years ago denied it in the most explicit manner, but recently a member of the Bureau of Fisheries, Doctor Kendall, has observed the habits, and has well illustrated it in a recent report published by the Bureau of Fisheries, giving the details of his work in New Hampshire and Maine.

The chair congratulates the congress upon the happy results of its meeting here, upon the excellent papers that have been presented, the harmonious relations that have been established; and the meeting will now stand adjourned sine die.

Thereupon, at 5.50 o'clock p. m., the congress took final adjournment.

During the week following the adjournment of the congress a party of foreign and local delegates visited points of special interest in New York and New England in accordance with a prearranged programme.

On September 28 Mr. Charles H. Townsend, director of the New York Aquarium, tendered a reception followed by a private view of the aquarium; Prof. H. Fairfield Osborn, president of the American Museum of Natural History, gave a reception and luncheon at the museum.

The party was met at Fall River, Mass., on September 29 by Mr. Henry C. Rowe, president of the Connecticut Oyster Growers' Association, and taken in a steam oyster vessel to his private oyster grounds in Narragansett Bay, where there was given a demonstration of oyster dredging, gathering of starfish from

the oyster beds, etc. The delegates then proceeded to Wickford, R. I., and were received by the governor of Rhode Island and the members of the Rhode Island Commission of Inland Fisheries on the latter's houseboat *Biophore*, where luncheon was served. The inspection of the lobster-rearing plant of the Rhode Island Commission, the main object of the visit, followed, after which the party proceeded to Newport for the night.

On September 30 the United States fisheries steamer *Fish Hawk* took the delegates from Newport to Woods Hole, Mass., where the government marine fish hatchery and laboratory were inspected.

In Boston on October 1 the delegates were the guests of the T Wharf Association and the Boston Fish Bureau, being escorted in automobiles to the fish wharves, fish-packing establishments, Quincy Market cold storage plant, and other points of interest. Hon. Curtis Guild, governor of Massachusetts, received and addressed the delegates at the statehouse. A complimentary luncheon was tendered by the fish merchants of Boston, and the delegates were there welcomed by the mayor of the city. At Harvard University President Eliot gave an informal reception and address, and the Museum of Comparative Zoology and other buildings were visited. In the evening the party were the guests of honor at a banquet provided by the fishery interests of Boston.

October 2 and 3 were spent in Gloucester, Mass., where a committee of the board of trade and the Master Mariners' Association escorted the visitors to the fish wharves, fish-curing and fish-packing plants, and fish-glue works, and the marine hatchery of the United States Bureau of Fisheries in Gloucester Harbor was inspected. The excursion terminated with a cruise on a mackerel schooner and a demonstration of purse-seine fishing, the boats being manned and the seine operated by the masters of mackerel vessels.

VIEWS AND RESOLUTIONS ADOPTED BY THE CONGRESS.

GENERAL VIEWS.

1. The congress learns with pleasure that the long standing fishery dispute between Great Britain and the United States affecting waters on the northeast coast of North America is likely to be submitted to settlement by arbitration at an early date.

2. We heartily commend the stand of the President of the United States in behalf of the conservation of natural resources, and congratulate him on the beneficial effects of his example and influence at home and abroad.

3. The congress advocates the establishment, in all countries having important fisheries, of national schools of fisheries and fish culture under government auspices.

4. The congress strongly urges the necessity of simplifying fishery laws by the elimination of qualifying clauses which so often provide loopholes through which offenders escape penalties and waters continue without protection.

5. In view of the injury to the fishing communities and the menace to the prosperity of important fishing industries on the Atlantic coast of the United States and Canada arising from the depredations of dogfish, especially of the spiny and smooth dogfishes, this congress favors uniform measures for the extermination or utilization of these injurious fishes in the contiguous waters referred to.

VIEWS OF UNITED STATES DELEGATES.

1. The condition at this time of the shad fishery in east coast streams forbodes ill for its future and demand energetic action on the part of the United States and Canadian provinces. We urge prompt action, especially with regard to interstate waters, that will so regulate fishing as definitely to insure the passage of a fair proportion of the run to the spawning grounds each season. A 10 per cent reduction in the catch at this time may prevent the ultimate destruction of a fishery worth \$1,500,000 yearly.

2. We heartily indorse the movement instituted by President Roosevelt for the conservation of our natural resources, and we pledge our official and personal support to measures for insuring the protection of our fishes and other aquatic creatures.

3. Believing that the welfare of all of our most valuable river fisheries demands the preservation of natural conditions at the headwaters of streams, we favor and urge the formation of the Appalachian Forest Reserve and other similar reserves which embrace the watersheds of important streams.

4. The convention between Great Britain and the United States under which the regulation and administration of the fisheries of the boundary waters of the United States and Canada will be undertaken by the respective federal governments marks an epoch in the history of our fisheries. We pledge our support to all measures that, after proper investigation, are found to be necessary for the preservation of the fisheries of the waters in question.

RESOLUTIONS.

1. That the thanks of the congress are due and are hereby tendered to the President of the United States, the Secretary of Commerce and Labor, and the authorities and citizens of the city of Washington for their cordial and effective support.

2. That the thanks of the congress are offered to the Italian Fisheries Society for its cordial invitation to hold the next session in Rome in 1911.

3. That the congress reaffirms the action of previous International Fishery Congresses in recommending an international exploration of the Mediterranean Sea in the interests of the fisheries.

4. That the congress records its sincere appreciation of the inestimable services of Dr. H. C. Bumpus as president and of Dr. Hugh M. Smith as secretary general of the congress, their untiring devotion and constant courtesy as principal officers of the congress having contributed so much to its success.

5. That thanks are freely extended to the following institutions for their generous entertainment and their contributions to the exhibits: The American Fisheries Society, the Blue Ridge Rod and Gun Club, the Alaska Packers' Association, the New England Forest, Fish, and Game Association, the National Geographic Society, the United States National Museum, and the United States Bureau of Fisheries.

6. That the thanks of the congress be, and are hereby, extended to the donors of the various competitive awards.

7. That the efficient and painstaking work of the international committee of awards merits special recognition, and is heartily appreciated by the congress.

8. That the proceedings of the congress be edited and published by the secretary general, who is authorized to incorporate in the volume of proceedings such papers as may have been received but which for lack of time or other reason may not have been formally brought before the congress.

9. That the secretary general be, and he is hereby, authorized and requested to bring the various views and resolutions adopted by the congress to the attention of all persons concerned or interested therein.

COMPETITIVE AWARDS.

In connection with the Fourth International Fishery Congress, arrangements were made for the award of money prizes for the best or most important investigations, discoveries, inventions, etc., relative to fisheries, aquiculture, ichthyology, fish pathology, and related subjects during the years 1906, 1907, and 1908. It was felt by the local management that, while the amounts of the individual prizes were not large, the conferring of the awards by so representative a body as the International Fishery Congress would induce many persons to compete and would result in much benefit to the fisheries and fish culture. In June, 1906, circulars announcing the subjects and conditions of the competition were issued in the English, French, and German languages and were extensively distributed. Several other circulars relating to the matter were sent out in 1907 and 1908.

LIST OF AWARDS.

1. By the AMERICAN FISHERIES SOCIETY: For a paper embodying the most important original observations and investigations regarding the cause, treatment, and prevention of a disease affecting a species of fish under cultivation, \$100.

2. By the AMERICAN MUSEUM OF NATURAL HISTORY, New York City: For an original paper describing and illustrating by specimens the best method of preparing fishes for museum and exhibition purposes, \$100.

3. By "FOREST AND STREAM," New York City (Mr. George Bird Grinnell, editor): For the best paper giving description, history, and methods of administration of a water, or waters, stocked and preserved as a commercial enterprise, in which angling is open to the public on payment of a fee, \$50.

4. By the MUSEUM OF THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES, Brooklyn, N. Y. (Mr. F. A. Lucas, curator in chief): For the best paper setting forth a plan for an educational exhibit of fishes, the species and specimens that should be shown, the method of arrangement, and suggestions for making such an exhibit instructive and attractive, \$100.

5. By the NEW YORK AQUARIUM, under the management of the New York Zoological Society, New York City (Mr. Charles H. Townsend, director): For an exposition of the best methods of combating fungus disease in fishes in captivity, \$150.

6. By the NEW YORK BOTANICAL GARDEN, New York City (Dr. N. L. Britton, director): For the best essay on any interrelation between marine plants and animals, \$100.

7. By the SMITHSONIAN INSTITUTION, Washington, D. C.: For the best essay or treatise on "International regulations of the fisheries on the high seas, their history, objects, and results," \$200.

8. By THE FISHERIES COMPANY, Philadelphia, Pa. (Mr. Joseph Wharton, president): For the best essay treating of the effects of fishing on the abundance and movements of surface-swimming fishes which go in schools, particularly the menhaden

and similar species, and the influence of such fishing on the fishes which may prey on such species, \$250.

9. By the UNITED STATES BUREAU OF FISHERIES, Washington, D. C.: For a report describing the most useful, new, and original principle, method, or apparatus to be employed in fish culture or in transporting live fishes (competition not open to employees of the Bureau), \$200.

10. By the WOLVERINE FISH COMPANY, Detroit, Mich.: For the best plan to promote the whitefish production of the Great Lakes, \$100.

11. By MR. HAYES BIGELOW, Brattleboro, Vt., member of the American Fisheries Society: For the best demonstration, based on original investigations and experiments, of the commercial possibilities of growing sponges from eggs or cuttings, \$100.

12. By HON. GEORGE M. BOWERS, United States Commissioner of Fisheries, Washington, D. C.: For the best demonstration of the efficacy of artificial propagation as applied to marine fishes, \$100.

13. By DR. H. C. BUMPUS, director of the American Museum of Natural History, New York City: For an original and practical method of lobster culture, \$100.

14. By MR. JOHN K. CHEYNEY, Tarpon Springs, Fla., member of the American Fisheries Society: For the best presentation treating of the methods of the world's sponge fisheries, the influence of such methods on the supply of sponges, and the most effective means of conserving the sponges.

15. By PROF. THEODORE GILL, honorary associate in zoology, Smithsonian Institution, Washington, D. C.: For the best methods of observing the habits and recording the life histories of fishes, with an illustrative example, \$100.

16. By DR. F. M. JOHNSON, Boston, Mass., member of the American Fisheries Society: For the best demonstration of the comparative value of different kinds of foods for use in rearing young salmonoids, taking into consideration cheapness, availability, and potentiality, \$150.

17. By the NEW YORK ACADEMY OF SCIENCES, New York City (Dr. N. L. Britton, president): For the contribution, not entered in competition for any other award, which shall be judged to have the greatest practical value to the fisheries or fish culture.

18. By MESSRS. HENRY HOLT & Co., publishers, New York City: For the best series of photographs, with brief descriptions, illustrating the capture of food or game fishes, \$100.

CONDITIONS GOVERNING COMPETITION.

1. Any person, association, or company may compete for any of the awards.
2. Each competitor shall, before July 15, 1908, notify the secretary-general of the congress as to the particular award for which he competes; and he shall duly qualify himself as a member of the congress.
3. Each paper or exhibit offered in competition shall be in the custody of the secretary-general on the day of opening of the congress.
4. Papers may be written in English, French, German, or Italian.
5. Each device, apparatus, process, or method for which an award is asked shall be represented by a sample, a model, or an illustrated description; and each shall be accompanied by a complete statement of the points for which an award is asked.
6. The congress reserves the right to publish, prior to their publication elsewhere, any papers or photographs submitted in competition, whether or not such papers or photographs receive awards: *Provided, however*, That in the event of the congress having failed to publish within six months after the session, an author will be at liberty to publish when and where he may elect.
7. The papers, appliances, exhibits, etc., submitted in competition for awards will be examined by an international committee to be designated by the president of the International Fishery Congress.

8. The committee will determine the competitors who are entitled to awards, and the decisions of the committee will be final.

9. The committee may call before it, in order to obtain additional information when desirable, persons who may have entered the competition and also other persons.

10. The committee may, at its discretion, withhold the award in any case if in its judgment no sufficiently worthy competition is presented; and it may divide an award if there are two competitions that it deems of equal merit.

11. The committee will make its report to the congress not later than the day preceding final adjournment.

12. The awards will be announced at a session of the congress, and each award will be accompanied by a special certificate or diploma suitably inscribed and bearing the signatures of the officers of the congress.

INTERNATIONAL COMMITTEE ON AWARDS.

At the opening session of the congress, the president appointed an international committee on awards, consisting of eighteen members who were not competitors. The committee, divided into five subcommittees to deal with the various groups of awards, consisted of the following, of whom Dr. E. A. Birge was chosen as general chairman:

For prizes numbered 3, 7, and 8—Dr. Oscar Nordqvist, chairman; Dr. Theo. S. Palmer, Maj. Richard Sylvester, Dr. Barton W. Evermann, Dr. W. S. Harban.

For prizes numbered 1, 5, 6, 11, 14, and 15—Dr. Decio Vinciguerra, chairman; Dr. E. A. Birge, Dr. F. B. Sumner, Dr. T. Kitahara.

For prize numbered 17—Dr. H. von Kadich, chairman; Dr. Henry B. Ward, Dr. Robert E. Coker.

For prizes numbered 9, 10, 12, 13, and 16—Dr. P. C. C. Hoek, chairman, Mr. W. E. Meehan, Mr. J. W. Titcomb.

For prizes numbered 2, 4, and 18—Dr. Gregoire Antipa, chairman; Dr. S. E. Meek, Dr. F. W. True.

THE AWARDS CONFERRED.

About 50 papers and exhibits were submitted in competition, many of which were of high value and embodied the results of painstaking research and experiment. The committee adopted the following rules for their guidance:

1. No prize shall be awarded except for a paper of exceptional value. Such paper should contain the results of an unusually thorough and complete investigation, or should announce an important new discovery or method.

2. It is not expedient to award less than a full prize to a single paper, although, following the general rules, a prize may be divided between papers of equal merit.

3. In case no award of a prize be given, the committee recommend that the donor be requested to allow the prize to remain open for competition at the next International Fishery Congress.

The committee reported their findings on September 25, and unanimously made the following awards:

No. 2: To Mr. Dwight Franklin, New York City.

No. 4: To Mr. Frederic A. Lucas, Museum of the Brooklyn Institute of Arts and Sciences, New York City, and Mr. Roy W. Miner, American Museum of Natural History, New York City (division of prize).

No. 7: To Mr. Charles H. Stevenson, U. S. Bureau of Fisheries, Washington, D. C.

No. 9: To Dr. A. D. Mead, Brown University, Providence, R. I.

No. 10: To Mr. Paul Reighard, University of Michigan, Ann Arbor, Mich.

No. 11: To Dr. Henry F. Moore, U. S. Bureau of Fisheries, Washington, D. C.

No. 13: To Dr. A. D. Mead, Brown University, Providence, R. I.

No. 14: To Dr. Henry F. Moore, U. S. Bureau of Fisheries, Washington, D. C.

No. 15: To Prof. Jacob Reighard, University of Michigan, Ann Arbor, Mich.

No. 16: To Mr. Charles G. Atkins, U. S. Fisheries Station, Craig Brook, Me.

No. 17: To Mr. John I. Solomon, New York City.

The committee recommended that no awards be made in the case of prizes numbered 1, 3, 5, 6, 8, 12, and 18. For one of these there was no competition and for the others the papers or exhibits were regarded either as not of sufficient merit or as not strictly within the terms of the award.

In recognition of his papers on the sponge fisheries, and his most praiseworthy efforts on behalf of the sponge fishermen, Mr. Charles Flegel, member of the Imperial Austrian Fishery Society, was awarded a special cash prize of \$50 by the officers of the congress.

PERMANENT COMMISSION OF THE INTERNATIONAL FISHERY CONGRESSES.

A meeting of the Permanent Commission of the International Fishery Congresses was held at Washington, D. C., on September 23, 1908, in connection with the Fourth International Fishery Congress. The meeting was called to order by the ex-officio chairman, Dr. Hermon C. Bumpus, president of the congress; and the following members were in attendance: Dr. Heinrich von Kadich, representing Austria; Prof. Decio Vinciguerra, representing Italy; Prof. Gregoire Antipa, representing Roumania; Dr. Oscar Fritiof Nordqvist, representing Sweden; Dr. Hugh M. Smith, representing the United States of America.

With the approval of the meeting, the representatives from various other countries were invited to be present, and the following were in attendance: Lieut. Radler de Aquino, representing Brazil; Mr. O. T. Olsen, representing Great Britain; Dr. Walther Naumann, representing Germany; Dr. Ramon Bengoechea, representing Guatemala; Chevalier Guido Rossati, representing Italy; Hon. José F. Godoy, representing Mexico.

Prof. Decio Vinciguerra presented a letter from the president of the Italian Fishery Society, extending on behalf of the society a very cordial invitation to hold the next congress at Rome in 1911, on the occasion of the fiftieth anniversary of Italian unity. An invitation having the same purport was likewise received from the mayor of Rome. After Professor Vinciguerra had seconded the invitation, the commission voted unanimously to accept it, and agreed to report their action to the congress for ratification.

Dr. Walther Naumann announced that at the next congress an invitation to hold the Sixth Congress in Germany would be formally presented.

A proposition from Mr. Nicholas Borodine, of Russia, for an international dictionary of fishing and fish-cultural terms in twelve languages was indorsed, and the secretary was directed to bring the matter to the attention of the congress with a favorable recommendation to the committee on resolutions.

Professor Vinciguerra proposed that at the next congress a scheme should be submitted for imposing more important duties and responsibilities on the Permanent Commission of International Fishery Congresses than have heretofore been assumed. On motion, duly seconded, a committee of three was appointed to consider this matter and report at the next congress, the committee consisting of Professor Vinciguerra (chairman), Dr. P. P. C. Hoek, of Holland, and Prof. Bruno Hofer, of Germany.

The meeting then adjourned.

HUGH M. SMITH, *Secretary*.

PUBLISHED WORKS PRESENTED BEFORE THE CONGRESS.

BELLINI, A.

Experiences sur l'élevage de l'anguille en stabulation à Commachio. Extrait du Bulletin de la Société centrale d'Aquiculture et de Pêche, 1907, Paris. Accompanied by reviews of the article (1) by E. Tiessen in Deutsche Fischerei-Correspondenz, April, 1908; (2) by Seligo, in separate from Deutsche Fischerei-Zeitung, Stettin; (3) by "H. R." in Allgemeine Fischerei-Zeitung, no. 3, 1908; and (4) by E. E. Leonhardt in Fischerei-Zeitung, December 21, 1907, Neudamm.

BESANA, G.

Ueber Kies- und Plattenerbrütung. Separat-Abdruck aus Nr. 13, Jg. 1908, Allgemeinen Fischerei-Zeitung.

Abnorme sviluppo di alghe nel Lago di Como danneggiante la pesca. Estratte dalla Rivista mensile di Pesca, anno X, n. 1-2. 1908.

CLODI, EDUARD.

Anleitung zur künstlichen Fischzucht und Teichwirtschaft, zum Selbstunterricht sowie für Lehrer und Teilnehmer an Fischerei-Kursen. Berlin, 1908.

DANNEVIG, G. M.

Bør Udlækningsarbeidet udvides og ogsaa omfatte Vestkystens Fjorde? Flødevig, July, 1908.

HOFER, BRUNO.

Atlas der Süßwasserfische von Mitteleuropa. Containing 31 colored plates. Text to be completed after October 1, 1908, comprising 600 pages large folio, with 300 illustrations.

Studien über die Hautsinnesorgane der Fische. I. Teil, Die Funktion der Seitenorgane bei den Fischen. Sonderabdruck a. d. Berichten der K. Bayer. Biologischen Versuchsstation in München, bd. 1. Stuttgart, 1907.

Berichte aus der Kgl. Bayerischen Biologischen Versuchsstation in München, bd. 1. Stuttgart, 1908.

Handbuch der Fischkrankheiten. 2. unveränderte Auflage. Stuttgart, 1906.

KUNZ, GEORGE FREDERICK, and STEVENSON, CHARLES HUGH.

The book of the pearl: The history, art, science, and industry of the queen of gems. With numerous plates, colored and black and white. Century Company, New York City. 1908.

MIRANDA RIBEIRO, ALÍPIO DE.

Fauna Braziliense, Peixes, I and II. Extrahido do XIV volume dos Archivos do Museu Nacional. 1907.

MOREIRA, CARLOS.

Crustaceos, Campanhas de Pesca do "Annie." Rio de Janeiro, 1906.

NICHOLSON, F. A.

Note on fisheries in Japan. Madras, 1907.

REITZENSTEIN VON.

Untersuchungen über die Lebensfähigkeit der mit dem Grundschieppnetz gefangenen Schollen in den Jahren 1906-1907. Sonderabdruck aus die Beteiligung Deutschlands an der internationalen Meeresforschung, Jahresbericht IV-V. Berlin, 1908.

SMITH, HUGH M.

The fishes of North Carolina. North Carolina Geological and Economic Survey, vol. II. Raleigh, 1907.

PERIODICALS AND GOVERNMENT REPORTS.

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